THE KNOWLEDGE

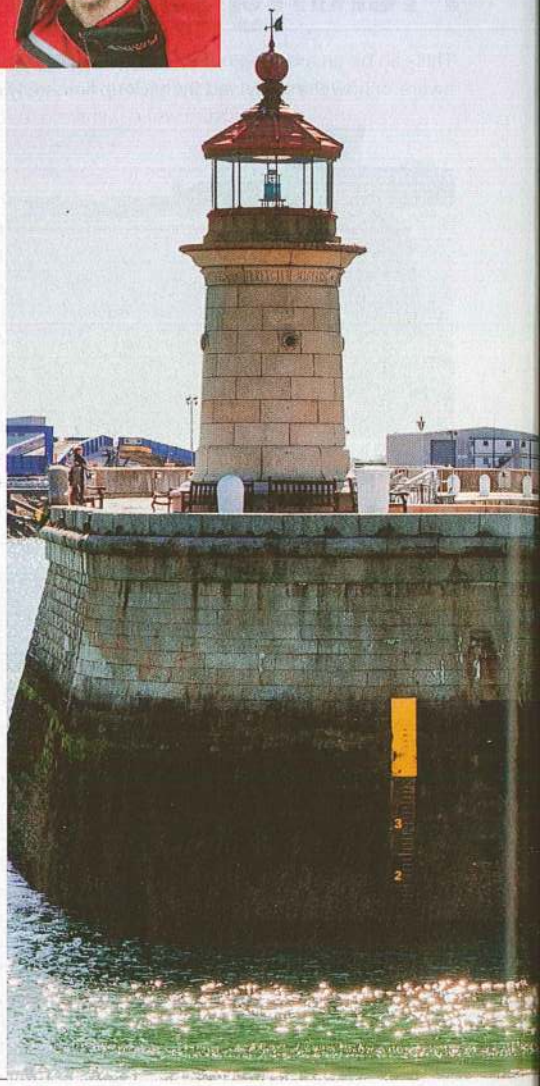
Mark Browse has sailed extensively around the UK, Med and Canaries, and took part in the 2006 Clipper Race. He now sails a Bénéteau 36 CC from Ipswich

'What time is high water?'

Mark Browse investigates why tidal times vary depending on the data source you consult, and which you should trust

When I started sailing 40 years ago, if you wanted to find out tide times and heights you just looked them up in a book. For a standard port this was a straightforward exercise, provided you knew how and when to adjust for daylight saving. For secondary ports there was a bit of work to do, looking up differences in minutes and metres and as often as not, interpolating between two figures using maths, graphs or your fingers.

Whatever approach you took, you would always be confident that the result was truly the time and height for high water and low water on the day that you were interested in. Sure, we always allowed a bit for safety and sometimes, if we were feeling clever, we even took into account such factors as atmospheric pressure and recent weather. But apart from these details, we always assumed that the numbers given by the tables were the truth. These days, however, there are many versions of the truth and we must discern which one we are to believe.



COMPARING PREDICTIONS

DOVER & RAMSGATE

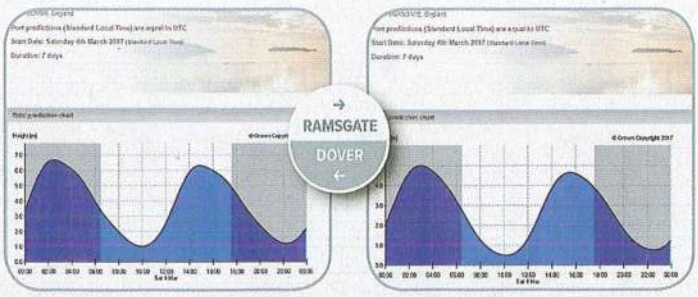
Choosing a harbour that many of us regularly refer to, I looked up the times of high and low water on March 4 for Dover and a secondary port, Ramsgate. I used a number of sources, including conventional tide tables and tide prediction apps.

TIDE PREDICTION

Similar to Absolute Tides and Tides Planner, but with a less slick interface

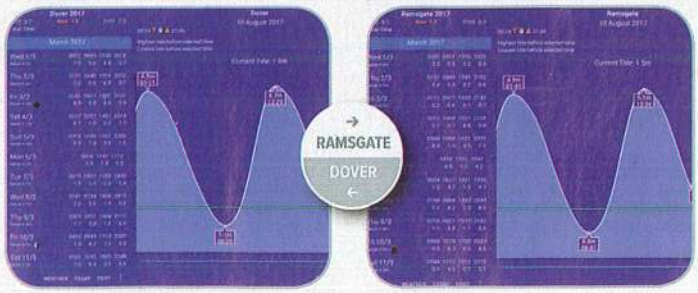
EASYTIDE

The UKHO Admiralty online service (www.ukho.gov.uk/easytide) for hundreds of ports around the world, which are free for predictions up to seven days



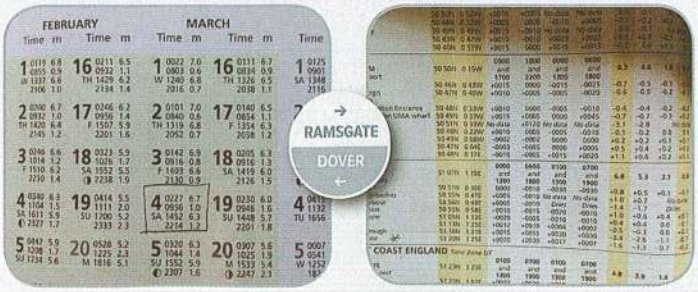
ABSOLUTE TIDES

This app is available for Android devices, which has similar functionality and cost to Tides Planner



REEDS/PBO SMALL CRAFT ALMANAC

Times and heights for Dover are taken from the tide tables. I calculated Ramsgate figures by interpolating between the differences in the traditional way



A SEA OF SOURCES

Books such as Reeds Almanac are still an essential part of the yachtsman's armoury. If you have taken an RYA theory course, you will be familiar with calculating tidal heights and times using nothing more than printed tables, paper, pencil and perhaps a calculator, working out depths to within a few centimetres and times to within a few minutes.

But in the digital age these methods are not the only source of information. The UK Hydrographic Office, for example, provides an online service called EasyTide that gives tables and tidal curves for hundreds of ports around the world. And there are countless other sources of information for the price of a cappuccino.

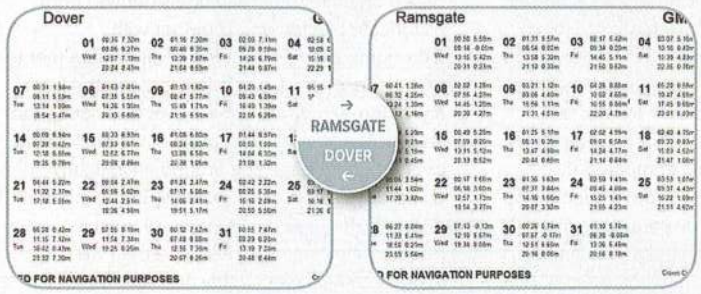
But do all these tools give the same answer and if not, which one do we believe?

Not so long ago I had a very enjoyable cruise aboard the beautiful classic pilot cutter *Eve of St Mawes*. In preparation for the trip, I opened EasyTide and printed tidal curves for some of the key ports in Cornwall and the Isles of Scilly that we were due to visit. Debbie Purser, the skipper, calculated her tides using the old-school method. I was surprised to see that she came up with noticeably different results. Debbie is an extremely capable skipper and I had absolutely no reason to doubt her workings. The difference between the data sets made me uncomfortable so, earlier this year, when I had a hundred and one better things to do, I decided to compare a number of different sources of tide data.

A few centimentres may not be much, but do you know how accurate your predictions are?

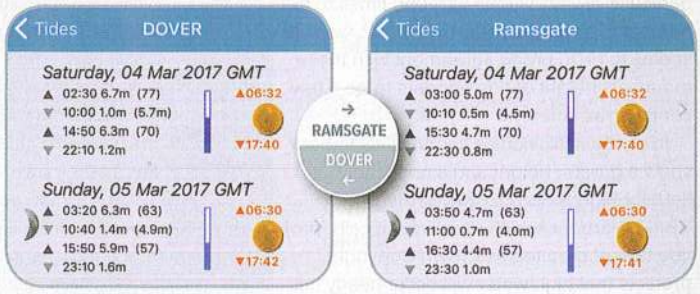
VISITMYHARBOUR.COM

This website provides free passage notes and charts of harbours around the UK. For a modest fee it gives access to online Admiralty charts and tide tables



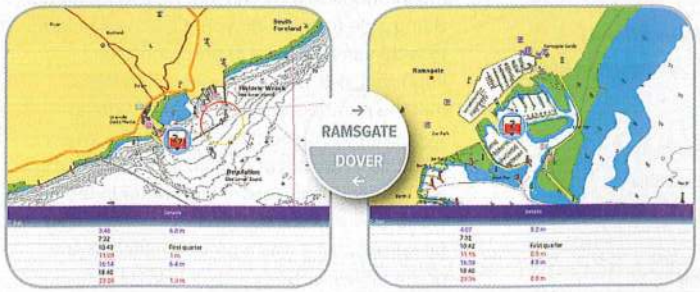
TIDES PLANNER

This app is published by Imray, available for iPhone/iPad. The app is free but an annual subscription gives you tide data and Admiralty tidal stream atlases



NAVIONICS BOATING HD

A fully featured navigation app that includes data about tide times, streams and heights. The app itself is free but you pay for the charts



TIDETIMES.ORG.UK

An online resource showing the times of high and low water for nearly 700 UK locations

How the different predictions compared

My sources of tidal data were a far from comprehensive list of sources available and, in most cases, they made it into my survey simply because I already had them to hand. I plotted the predicted times and heights on a graph. This is what I came up with for high water Dover on the day in question.

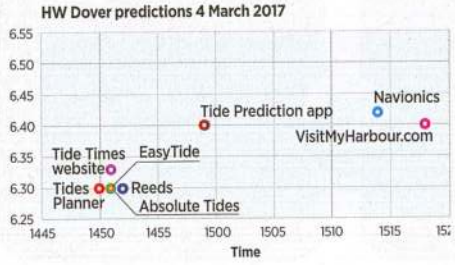
HW DOVER PREDICTIONS

When I plotted the times of high water Dover on to a graph, it showed quite a spread between the various sources of data. There is a cluster in the bottom left-hand corner, indicating that Absolute Tides, EasyTide and Reeds were all essentially using the same model, with slightly different levels of precision.

My personal favourite, Tides Planner, in particular always seems to round times to the nearest five minutes. The Tide Times website seems to be in broad agreement with these, though its height of tide appears to be a few centimetres different.

In contrast, Navionics and VisitMyHarbour show a greater height and a noticeably later time for high water. Most surprisingly, VisitMyHarbour, which uses what it calls 'proper tide tables' credited as Crown Copyright, predicts that high water will occur nearly half an hour after the time indicated by the UKHO's own EasyTide, and with 10cm more height.

The graph for high water at the secondary port Ramsgate on the same day looks like this:



HW RAMSGATE PREDICTIONS

Again there is considerable disparity between the various sources; it is interesting to note that for the secondary port there is a wider range in heights but a narrower spread of times. The Tide Prediction app did not have Ramsgate in its database, so it doesn't appear on this graph. The other data points are somewhat more spread out than in the Dover graph, perhaps indicating that they are using slightly different assumptions about how to interpolate for a secondary port. It is curious that the UKHO EasyTide gives a result that is markedly different from the tables in Reeds; and once again VisitMyHarbour and Navionics are on their own. I also compared the predictions for low water at both Dover and Ramsgate, with similarly disparate results.

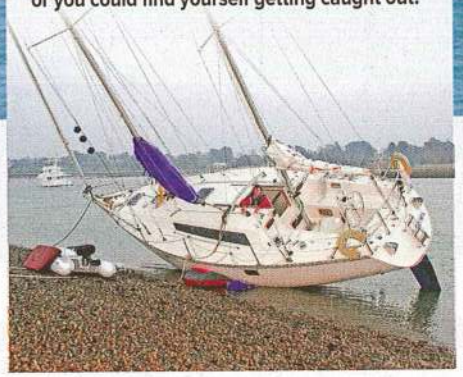
→ RAMSGATE
DOVER ←

What conclusions can we draw from this exercise? The variances between the different results are not huge, amounting to at most 23cm and 28 minutes; but there are times when you want to be as precise as possible. The tide predictions given by the various sources are based on mathematical models derived from historical observations, together with astronomical data about the relative movements of the sun, moon and Earth. It is clear that there are different models and ways of calculating the results. The sea is a vast body of water sloshing over an uneven seabed around an infinitely complex coastline, so predicting to the minute and centimetre when the tide will be at its height is almost impossible. The best we can do is to make a reasonably accurate prediction and even then, a lively barometer reading or a sustained onshore wind may change things.

As with the weather, there are many different sources and prudent seafarers will take all the information they can to form a judgement. Being able to calculate your times and heights to within an RYA level of precision is an important skill, but equally, an awareness that the numbers you come up with do not necessarily represent the truth is vital. When I did this, I was not in a position to find out the actual height and time of high water in the real-world Dover or Ramsgate on that day, but I'd be surprised if it was a precise match to any of the tables, apps or websites that I consulted.

Leave a seamanlike safety margin

It is worth reiterating that tidal data, like weather forecasts, are only ever intended to be predictions. Actual times and heights will vary depending on atmospheric pressure, storm surges and silting. Like forecasts, you should consult more than one source, or you could find yourself getting caught out.



Kieran Flatt