

ALL ABOUT TIDES AND TIDE MOVEMENT CLOCKS

If you are reading this, you may be thinking about getting a tide clock, or looking to understand if/how they work. Please read on...

The basics.... What is the tide and what creates it?

In a nutshell, Earth, Moon, Sun, Gravity & rotation. The simple explanation is that the moon's gravity pulls the water towards it so as the earth rotates, the water gets pulled from the sides creating a high tide where the moon is closest. As the earth rotates and the moon goes overhead of any given spot on the equator every 24 hours 50 minutes & 14 seconds, so does the high tide. But...

The action of the water being pulled from the sides of the earth means that the water level on the sides drops but that the water round the back of the Earth is still at the original level, which is now higher than the sides, creating a second high tide, that occurs directly opposite the first high tide.

So Is That All There Is To It Then?....no.

Because the sun is so massive, its gravity also has an effect on the tides and obviously the sun is in a completely different location and cycle to the moon. This means there are times when the moon and sun are in a line with each other which adds all the gravity effects together, and times when they are at right angles to the earth which offsets each other's gravity effects.

The end result is that the low tides get lower the high tides get higher when the moon and sun are in a line with the earth, and we can also see the opposite where the high tides get lower, and the low tides get higher when the moon and sun are at right angles to each other from the earth.

Does everyone get a cycle of 2 high and 2 low tides every 24 hours, 50 minutes and 14 seconds?

No, it was never going to be that simple. If you're not already getting the impression that this stuff has many, many other factors affecting it, then you will after the next few paragraphs.

Tide patterns come in 3 basic forms, although some of the variations we will mention in a minute. Around many of the world's coasts (including the UK) we get what is called a Semidiurnal pattern, which is two high and low tides a day. A small number of places get just one high and low tide each lunar day (Diurnal) and this is the most uncommon tide type, with the rest of the planet experiencing what is known as a mixed tidal cycle.

So, we mentioned 'variations' in the previous paragraph. Numerous factors affect the tide like the depth of water and other geographic features. These can introduce secondary tides which create double high tides and double low tides. And of course, not everybody of water has enough volume to have a noticeable tidal effect. Did you know that the earth causes a tide on the moon too? But because there is no water there, the tide is actually a bulge in the moon's dust and rock surface, of some 60 metres high or so. It does not move round the moon like our ocean tides do though due to us always having the same side of the moon facing the earth.

Ok, so moving on, we have established that round most of the UK we have a semidiurnal tide, which means we should be able to track the tide with a tide clock, right?

Yes...but there is a 'but'. We know the lunar day is 24 hours and 50 minutes approx., so this principle is what a tide clock uses by rotating a complete turn every 12 hours and 25 minutes. However, very few places have the perfect tide of 6 hours and 12.5 minutes for the tide coming in, and then the same for the tide going out. In fact, nowhere does. The problem comes from the moon and sun interaction causing the difference in timing along with numerous other factors, and we won't go into seasons and the changes in the distance from the sun having even more effect. If your curious just how messed up the tide can get just around the UK coast lines, check out the daily tide patterns around Southampton's double high tides, Weymouth's complex double low tides, or Lowestoft with the result of mixing a notable Diurnal tide with a main Semidiurnal tide.

So, with a tide clock expecting a 12 hours and 25 minute cycle, but in reality getting anything but, what good are they?

From the diagram shown adjacent, you can see how the length of the daily cycle increases and decreases dependant on the moon phase. As the lunar cycle passes through the complete cycle, the errors of aligning to the real tide timing get cancelled out, and at several points during the 29.5 day cycle the clock perfectly synchronises. When the Tide clock is out of sync during the other times in the month, it should only be by a relatively small portion of a single tide cycle, so will still act as a good indication of where the tide is and if it is rising or falling from a simple and quick glance.

