READING BETWEEN THE LINES IN THE WEATHER FORECAST

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The marine weather forecast is deliberately short and pithy, so the main details only are delivered. A certain amount of the meaning of the words used is left unstated, and this is covered in the various Coastguard boating education courses which those going to sea will have completed. It is also worthwhile reminding ourselves every so often, of some of these explanations.

In the marine forecast that phrase "Southwest swell three metres" means that the forecaster is picking that, to the nearest metre, the significant height of the swell rolling in from the ocean will be three metres in the area sufficiently offshore that is not interfered with by the near shore breakers.

By significant height we mean the average wave height, for example, when one casts an eye across the seascape our brain automatically averages out the wave pattern and reports the average top 2/3rds of the wave height and we call this the significant height, which is what is forecasted. This may seem to be a strange definition, whereas the true height is measured from the bottom of the trough to the top or crest of a wave. Measuring the separation between waves can be done either with wave length or wave period. Usually we use the period, and this is mentioned in the more technical marine forecasts. The period the time it takes from the arrival of one crest (or trough) to the next. Technically the period applies to waves travelling past a fixed point, but for most practical purposes we can apply it as we move through the waves.

Swell waves rolling in from over the horizon have had time to sort themselves out and thus have a long period of over 10 seconds between each wave. Waves that have been formed by the local wind have not sorted them selves out and thus usually have a period of between three and seven seconds.

Waves are generated by wind blowing over water, and over the open sea this produces a swell which is a spectrum of waves with a mathematical relationship linking frequency with height or Hs.

As you travel through the waves, one in six, on average, will be equal to or taller than Hs, and the others will be smaller. This is consistent with Hs being the average of the top third waves. Assuming a period of around 10 seconds between waves, this means that once a minute you will encounter a wave with height

Hs. This ties in with your observations of breakers on the beach. They reach a peak at the rate of about one in six or seven waves, and this is around once a minute.

The most probable wave height that you will encounter is less than Hs, and is only 60 percent or almost half of Hs,

The occasional wave has a height 50 percent higher than Hs, and this occurs at the rate of one in 66 or, assuming a period of around five to 10 seconds, that's once every five to 11 minutes.

The maximum wave that, mathematically, you should be on alert in any particular swell spectrum is twice that of Hs and is the highest in a thousand or so waves or the highest wave you are likely to encounter in each 24 hours.

In the real world waves get into and go out of phase all the time. When waves gather to form one gigantic monster, or a packet of them, or a pyramid that is more than twice the significant height of the surrounding waves, it is called a rogue wave. These freaks are now known to occur more often than we thought, and can be a hazard to anyone who encounters them, but the chances are very small. Our knowledge in this area is still developing and present ideas of how they form is either through some sort of focussing by coast/seabed shape or currents, or starting off as a normal wind wave but developing in a non-linear way and feeding on the energy of surrounding waves.