NCI FLEETWOOD TRAINING MANUAL

PART 6

TIDES

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Introduction

For watchkeepers an understanding of what the tide is doing is as important as having up-to-date weather information. In Morecambe Bay the tide can rise or fall anything between 2.0 and 10.5 metres twice a day and at its fastest the tidal bore can reach a speed of 9 knots, faster than all but the best horses.

Tides are due to gravitational attraction of the moon and the sun on the earth. In North-West Europe this effect produces two complete tidal cycles in a lunar day (about 24 hours 50 minutes).

High tide, at any given place, occurs about 12 hours 25 minutes after the preceding high tide. High tide gets progressively later by almost an hour a day. Low tide also occurs at intervals of about 12 hours 25 minutes but not necessarily mid-way between high tides.

The Vertical Movement of Tides

Range

The difference in height between low and high tide, usually measured in metres

Spring Tide

When the moon and sun line up with the earth, their combined gravitational effect produces higher than average high tides and lower than average low tides. Spring tides have the largest range. They occur about once every 14-15 days, 2-3 days after a full moon and a new moon.

Neap Tide

When the sun and moon are not in line but at right angles their reduced gravitational effect produces lower than average high tides and higher than average low tides. Neap tides have the smallest range. They occur about once every 14-15 days, 4-5 days before full and new moon.

Chart Datum.

This is the reference level used for soundings and tidal predictions that are found in tide tables and on charts. Chart datum is approximately the level of the Lowest Astronomical Tide (LAT). The LAT is the lowest sea level predicted to occur under average meteorological conditions.

Charted depth

The vertical distance from chart datum to the seabed. This is shown on nautical charts as a number in italics such as *6.* A subscript number next to the large number measures tenths of a metre. 5_2 indicates a depth of 5.2 metres

Drying Heights

Areas coloured green on the chart indicate that the area dries out at low tide and the numbers have a line under them ($\underline{1_2}$) indicating how high they are above chart datum

Height of Tide

The vertical distance between chart datum and sea level at a given time.

Flood

The rising or incoming tide.

Ebb

The falling or outgoing tide.

Obtaining Tidal Information

Tide Tables.

These are based on the tidal predictions for Standard Ports e.g. Liverpool.
To obtain the tide times for Fleetwood (a Secondary Port) a mathematical calculation based on the tides of the Standard Port of Liverpool is used. Tide times for Fleetwood, showing local time, are displayed at the Lifeboat Station and by Wyre Borough at various points along the promenade. It is also entered daily on the watchstation noticeboard with an indication of the tide being 'spring' or 'neap'.

The tide times used at the watchstation are found on the home page of the Rossall Point NCI web page and are to be recorded in the station logbook at the top of each log book page.

Calculating Tide Height

Although tide tables indicate the predicted height and time of high and low tide they do not provide information regarding the height of tide at any of the times between. The most accurate method of measuring such heights is by use of a tidal curve for the standard port.

A rough estimation of the height of the tide can be made using the "Rule of Twelfths"

The rule assumes that the duration of the rise or fall of a tide is approximately 6 hours.

First the range of the tide needs to be determined and that measurement is divided by 12.

E.g. the range is 6 metres divided by 12 equals 0.5

Starting from the time of Low tide the table below shows approximately how much the tide rises each hour until high tide.

Hour	Rise 12ths	Rise height	Total rise
First	1/12th	0.5	0.5
Second	2/12^{ths}	1.0	1.5
Third	3/12^{ths}	1.5	3.0
Fourth	3/12^{ths}	1.5	4.5
Fifth	2/12^{ths}	1.0	5.5
Sixth	1/12th	0.5	6.0

The Horizontal Movement of Tides

Tidal Streams

In tidal waters, anything floating on the surface of the water is affected by tidal stream. This is the horizontal movement of the sea caused by the rise and fall of the tide. The rate of the surface current of tidal streams will generally increase when tide and wind are from the same direction and decrease when the wind is against the tide.

Set

The compass direction towards which a tidal stream flows, measured in degrees.

Rate

The speed in knots at which a tidal stream flows.

Drift

The distance the stream carries in a period of time.

Slack Tide / Slack Water

The interval at the turn of the tide when little or no stream flows.

Tidal Diamonds

Tidal streams that have been measured are marked on Admiralty charts by a letter within a purple diamond.

An associated table at the top of the tower Admiralty Chart shows the set (direction) and the rate (speed) of the streams at these positions for each hour before and after high water at the standard port specified above the table. Two speeds are shown, one for spring tides and one for neap tides. A mid-point should be chosen for periods between spring and neap.

The first column shows the hours before and after high water at the standard port of Liverpool.

The second column shows the set (direction) in degrees of the flow for each hour.

The rate (Speed) of the flow is shown in the next column. The first row is the speed in knots when there is a spring tide and the second row for when there is a neap tide.,

The tide table for Liverpool is set for local time so no other time adjustment is necessary.

Local Port

At low tide there is insufficient depth for shipping to be able to enter or leave the yacht basin.

The lock gate at Fleetwood opens to allow shipping into or out of the port 1½ hours before high tide and closes 1½ after high tide.

Calculating Drift

SAR organisations use highly accurate computer programs to calculate the potential drift of a target due to tides and wind.

Local knowledge of the set and rate of tides allows a watchkeeper to anticipate the drift of a target during an incident. However, it is far more important that watchkeepers keep a target in view than they refer to tables and charts trying to anticipate where a target will be in a few minutes time.

If a target is lost from view it is better that all available watchkeepers are visually searching the area to re-establish contact.