

## SUMMARY OF CHECKS ON AUTOMATIC TIDE GAUGE

(For instructions on completing this form—see back)

Week commencing 22 October 1984Place LERHICK SHELANDTime kept (GMT or BST or Zone) GMTDate and time of starting record 22-10-84 0930 Date and time of removing record 29-10-84 0930

Date	Correct Time	Time on Chart	Height of tide on tide scale	Height of tide on Chart	Scend on tide scale	WIND		Remarks (including times of sudden changes in wind force or direction)	Initials of Checker
						Direction	Force		
22-10-84	0930	0930	2.24	2.04	0.2	SE	6/7	SILT CLEARED BY DIVER 1200. Overcast with rain.	JW
23-10-84	0940	0939	2.20	2.18	0.1	WSW	6/7	Clock not corrected Heavy showers.	JD
24-10-84	0935	0933	1.80	1.80	NIL	WSW	5	Clock not corrected Cloudy + showery	SA
25-10-84	0930	-	1.62	-	NIL	ESE	6/7	CLOCK STOPPED Mon 0 03 40 V P21 RESE. Overcast with rain.	JE
26-10-84	0930	0830	1.3	1.29	0.1	Nly.	3/4	Found started at Wroughour Contin. rain. Corrected at 1230	SA
27-10-84	0926	0925	1.00	1.00	NIL	Wly.	2-3	Clock not corrected. Overcast / drizzle.	AS.
28-10-84	0928	0926	1.02	1.02	NIL	SE	7-8	Clock not corrected Showers.	JRS
29-10-84	0930	0925	0.90	0.90	NIL	SLY	4	Fine. Pen 5 min slow on removal	RJM

James MacFisher  
Officer in charge of gauge

Table 4.1

## 4.2.2 MECHANICAL ERRORS

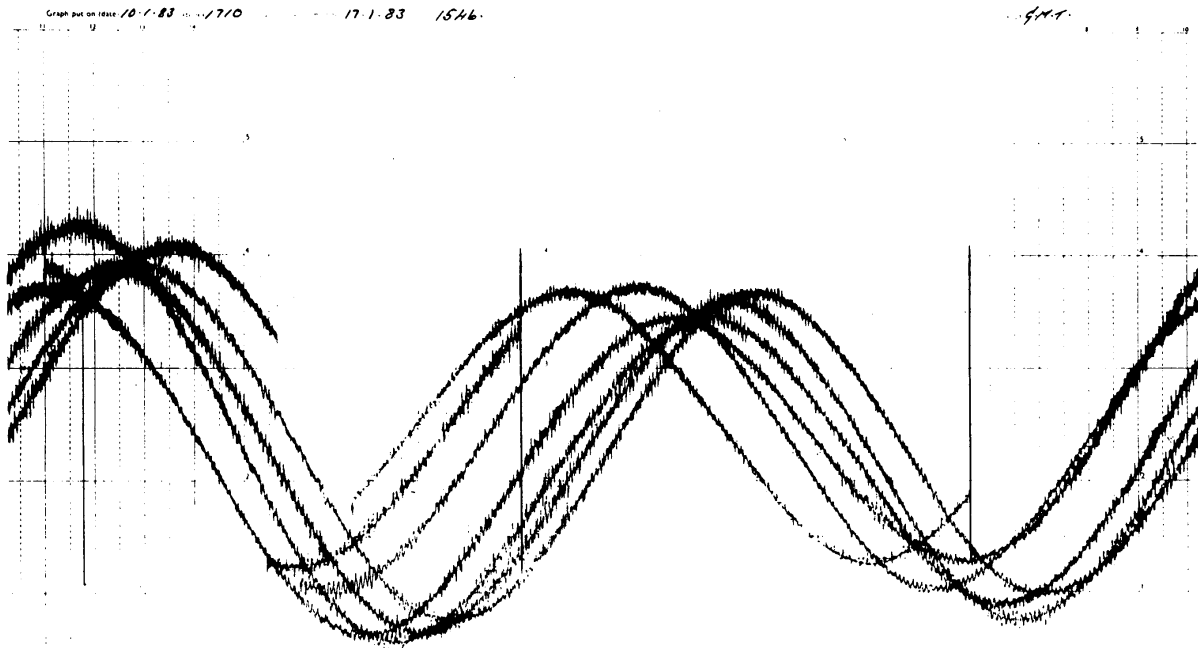
In all cases, operator's comments on check sheets or charts themselves help to identify any problems.

Many mechanical problems can have the same visual effect on the charts and without comment can be difficult to classify. If there are no comments to help, it is recommended to check out a strange tidal profile against records from a nearby site where available. This exercise proves whether the effect is mechanical and therefore a unique fault, or caused by weather conditions. The former can often be interpolated or corrected in some way, whereas meteorological effects should never be nullified.

Whatever the mechanical error, the need from the data-reduction point of view (and ultimate analysis) is to minimise the gaps so caused.

But this practice of filling gaps must be executed with caution and, where relevant, local knowledge of the tidal profile. Nothing is achieved by filling a gap in observations with predicted values, or artistic impressions when there is a likelihood of storms or high winds (see **Figures 4.5 a, b and c**).





**Figure 4.5c** Clock stoppages. Presence of storms prevents interpolation

**(i) Clock Failures**

Time errors are dealt with in [section 4.3](#), but clock stoppages are fairly easily identified by a vertical line.

So long as not more than one high tide and one low tide have lapsed before discovery of the fault, it is possible to draw in the likely tidal profile.

The extent of the pen trace (because its mechanism is linked with the float gearings) will indicate the heights of high and low water – thus making the remainder of the profile sketchable. Caution must be applied in guessing the times of these extremes, however. If severe weather effects are involved it is better to omit the record.

If more than one tide has lapsed the ink trace will only indicate the extremes of levels achieved – and interpolation must not be attempted.

**(ii) Ink Run Out or Pen Off Record**

If there are recordings of the profile either side of a missing section, it is possible to sketch in the missing trace. No more than six to seven hours should be attempted. As for clock stoppages above, the most critical portion of tide that should not be guessed are high and low waters.

### **(iii) Float Jamming**

This problem manifests itself as steps on the record, because the float is caught and then released. Small periods of up to an hour can be interpolated without trouble. If the fouling is severe however, the resultant records will also show the affects of siltation.

### **(iv) Silt**

The effect of silt in the well will cause a delay in the flow of water with the tide. Occasionally this effect is visible on the record – (particularly if the normal record is familiar), but more often the evidence is not clear until a full analysis is undertaken, unless the silt builds to a high level when the profile will be totally distorted. Sometimes silt will show as “flats” at low and high water, particularly at spring tides. If several days’ record are effected, it is advisable to leave a gap until the well is cleared – which should be noted on the charts or check sheets.

### **(v) Overriding Turns on Float Cable**

This problem does not always show at all on the tidal records, particularly if it is a constantly occurring problem. The only occasions when detection and interpolation is possible is if the wire suddenly releases after a few turns. This, like the float jamming, will show as small steps that can be sketched through.

## **4.2.3 WEATHER EFFECTS**

The effects of the tidal forces of the sun and moon on the Earth’s oceans are distorted by the presence of land masses, variations in water depth and atmospheric conditions. Some of these effects are clearly evident on the tidal records.

### **(i) Seiches**

These are short period oscillations typical of shallow enclosed basins like the North Sea and some enclosed harbours. These effects should be smoothed, or filtered out, when extracting tidal levels from the records (see [Figure 4.6](#)).

### **(ii) Storm Surges**

Changes in winds and atmospheric pressure can cause the observed tidal level to be very different from the predicted value especially during storms. These can produce unusually high tides (positive surges), or unusually low tides (negative surges). The timing of the tides can also be considerably altered from the normal, making day sorting, where not already labelled, difficult.

These effects should **NOT** be smoothed, or filtered out, when extracting tidal levels from the records (see [Figure 4.7](#)).