THE DREDGING OF NAB SHOAL 1961-1962

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During November of 1961 work was started on a large project by the Esso Petroleum Co. Ltd., to deepen the approaches to the Port of Southampton, and also parts of Southampton Water, with a view to getting their new super tankers to the refinery at Fawley on any high tide of the year. The first stage was to dredge a channel 1 500 feet wide and some 6 000 feet long through the bank to the north of Nab Tower, which rises to a level of 39 feet below chart datum, thus being too shoal for certain ships to pass safely over at neap stages of the tide.

The nearest coast line to the chosen area for deepening is around Bembridge, Isle of Wight, some four miles to the west, making visual fixing very difficult except during periods of exceptional visibility, and even then the normal two angle fix would leave a lot to be desired with the natural marks available for use. Buoys could have been used but the area was in the open sea and very exposed to the S. W. making positive fixing difficult to say the least. Consequently a Hi-Fix chain was hired from Decca Navigator Co., and set up by them as a hyperbolic pattern, with the Master at Wittering, Pattern one slave at Bembridge, and Pattern two slave at Selsey.

This arrangement of the chain gave a relatively short base line between Master and Pattern two slave with subsequent reduced accuracy in the dredging area, but on the other hand with this set up, the Pattern one lanes were almost parallel to the channel and the Pattern two lanes very nearly at right angles which was the ideal arrangement from the point of view of dredging, and also of course most convenient for control of the survey craft. The accuracy on Pattern two was not lost in any serious degree and certainly not sufficient in any way to affect the dredgers. The lane width of Pattern two being in the order of 300 metres gave an overall working accuracy of plus or minus 10 metres or thereabouts. This was admittedly a disadvantage as far as the survey was concerned, but for the dredger maximum accuracy was obtained across the channel, which was most important, to avoid over or under dredging the margins; in this direction the Pattern one accuracy was in the order of 3 metres.

The lanes being parallel and perpendicular to the channel in this way made it simple for the dredger crews and superintendents to quickly grasp the idea behind the system, and thus orientate themselves and think

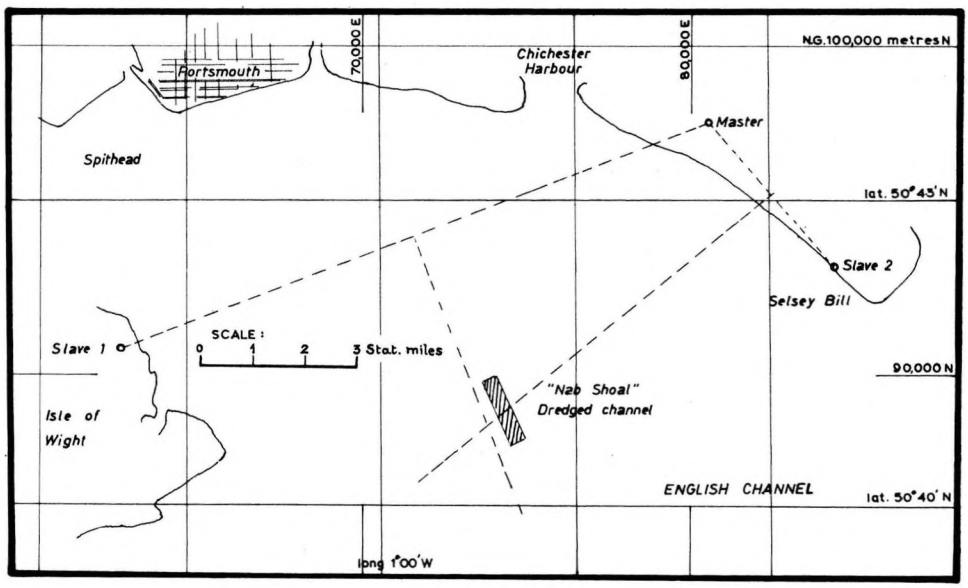
in terms of Decca co-ordinates, and transfer it mentally to Port or Starboard helm, and ahead or astern. The track plotter was placed close to the helmsman which helped this process, and displayed the system in a familiar plan form with only some distortion of shape. Some difficulty was experienced in the early stages by the crews in keeping the equipment in adjustment, so that losses of control were fairly frequent; but they rapidly became used to the various operations required of them and also, three temporary buoys had been laid by Trinity House along the line of the channel, so that these temporary losses of control had minimum effect on the operation of the dredger, they being able to regain lost lanes, and reset the equipment, with the minimum of time lost.

Three Decca operators were employed on the chain throughout the operation. This is more than a chain of this kind would normally require, but the difficulties of having one slave isolated on the Isle of Wight warranted the use of an extra operator. Normally two men could easily operate a chain such as this, once the initial setting up and necessary calibrations had been completed and any technical teething troubles sorted out.

The problems of the follow-up surveys were similar to survey problems anywhere when making use of a Decca Navigator system, and the more specialised problems of accuracy checks using this more sensitive type of equipment have been discussed elsewhere. In this particular case the scale of the survey was initially 1/1 250 but this was later changed to 1/2 500 having regard to the utility of such a large scale, working with trailer dredgers (*) over a large area; and also, of course, the fact that this particular chain, for reasons mentioned earlier, did not warrant such a large scale as 1/1 250. The check lines were being run at intervals of 30 metres so that the revised scale was far more suitable in all respects.

I must add here that to attempt the type of survey undertaken by Kelvin Hughes on the Nab Shoal would be extremely difficult without the use of a Hi-Fix chain. We were attempting to sound within three inches accuracy, after making due allowances for differences in tidal levels and distance of tide gauges. The Nab Shoal is virtually in the open Channel, and our main problem was to get sufficiently calm weather, through the Winter period especially, to sound to these limits. The days on which sea conditions were suitable, and at the same time shore marks visible, were few and far between. It normally took us two days to complete the sounding of the whole area, by sounding without pause, throughout the day. This would have been physically impossible using visual methods, and as the periods of suitable conditions were usually very short, often only the two days, then the follow-up sounding would have been incomplete and spasmodic, whereas with the Hi-Fix chain in use, we were able to present a series of complete surveys at fairly regular intervals, which in the early stages especially, was a major part of the project : it being unknown, and a matter for some speculation whether or not the trench, or channel, as it became later, would stand up to the prevailing weather conditions and thus make the scheme uneconomical.

(*) i.e. self-propelled suction hopper dredgers.



The equipment generally stood up very well to the use we made of it. Shore station breakdowns were rare and the chain was off the air only for a short time during any breakdown. The pattern was very stable, having a movement most of the time of less than 2/100 of a lane, this being monitored automatically enabling survey plotting to be corrected, and adjustment made each day for the dredgers. One dredger in the early stages experienced a certain amount of equipment failure and two sets were eventually installed, so that in the event of breakdown, the track plotter only had to be changed over, preventing even a pause in operation. These two sets gave rise to some comment, as it was noticed when dredging that the two sets showed slightly different Pattern one readings, until it was discovered that the difference corresponded exactly in lanes with distance apart of the two aerials. This satisfied even the most critical observer.

The equipment in the survey craft which was in less comfortable surroundings for the Winter months started to give spasmodic trouble at one stage causing some anxiety, as the loss of one day of good weather could be most inconvenient and mean a long wait for the return of suitable conditions, so naturally the Kelvin Hughes team of Surveyors were extremely sensitive about the operation of their ship's equipment. The ship's generating plant and various electrical appliances were found to be affecting the Decca equipment, so that this had to be carefully isolated, and then it was found that during very cold weather changes in temperature caused some trouble with the equipment due to its being switched off at night, and then hurriedly warmed up again in the mornings, so that eventually the equipment was left running continuously to overcome this problem, care being taken to see that a continuous supply of batteries was available.

In conclusion, the dredging could have been carried out by visual methods, just as the survey could have been, but by using a Hi-Fix chain

so that the dredger could be continuously fixed in the channel, thus enabling them to be rigidly controlled, and to be dredging in pre-planned and pre-plotted areas in any weather, so much valuable time was saved, and the whole project was carried through smoothly and efficiently to a successful and satisfactory conclusion.