

of the work to buoys securely attached to anchors and large stone blocks sunk in the mud.

The concrete material was brought alongside the mixer in forty-ton wooden barges, which were loaded at the harbour works pier from the stock piles. This pier had been fitted up primarily for the construction of the breakwaters previously mentioned, and was afterwards used for this work. It was equipped with four 20-ton Stothert and Pitt car tipping cranes for loading and unloading material. Several millions of tons of construction material for the breakwaters and this work were handled in this way.

The concrete shuttering for the quay wall was made in 20 ft. x 4 ft. panels of 3" planking, strongly braced with 9" x 4½" stuff, ballast consisting of old rails being attached to the bottom of the panels on the outside in sufficient quantity to sink them into position.

The panels were stored on a barge alongside the mixer and handled by the mixer cranes.

They were set up in the foundation in parallel lines back and front of the wall and strutted on the outside with light rails and timbers.

Small buoys were attached by lines to the corners of each section to guide the craneman in depositing the concrete.

In order to set out the line of the work a barge was securely moored over the work so as to practically eliminate movement, and the line was given by a transit from fixed points on shore. A 30-lb. plumb-bob, suspended by thin piano wire, was used to continue the line from the point on the barge down to the diver. This method proved to be quite satisfactory in ordinary weather.

Afterwards, when the gantry was erected, line was given from the overhanging boom of the blocksetting cranes.

In the lower part of the work the divers experienced some difficulty from the partial darkness in the foundation trench and the cement particles floating in the water which obstructed the light. Electric lights under water were tried to overcome this difficulty, but were not very successful, and were abandoned by the divers when they had accustomed themselves to the layout of the work. When a one hundred-foot length of the bottom 4 ft. layer had been put in, the shuttering was stripped, the trench filled in with stone to the level of the top of the concrete, and the shuttering reset for another layer.

As soon as the blockwork level was reached, the concrete was levelled off to receive the blocks and careful line and level given from the gantry, which was erected as soon as the trench behind the wall had been filled up.

A light section steel rail was used by the diver to level off the