

602. What is the width of your breakwater?—36 feet at the base, and 28 feet at the top.

603. *Mr. Moss.*] Do you think it desirable, or even practicable, to carry out works of this kind without some skilled engineering supervision?—Well, that is a rather personal question. At the same time, I think it is utterly impossible.

604. We will put it in a different way. Perhaps that was an invidious way. Take these works at Taranaki: Are not these works liable to accident; and might it not even be found necessary to modify the original plans when carrying out the work? In order to do that you must have some professional engineer to supervise the work?—That is really where the point is. A clerk of works, or a skilled overseer, might carry on the works with perfect safety as long as all went right. But untoward accidents will occur sometimes; and, even if a clerk of works might propose a remedy, it might not prove to be the right one. In my own case, when we had gone on about 100 feet our crane broke down, and delayed our works a fortnight. Being shallow water, with the shingle shifting up rapidly behind, the case was difficult, but had to be dealt with promptly. A clerk of works, in that case, would have sent for an engineer, and the works would have been delayed and valuable time lost. I ordered the contractor to put down blocks immediately, and to carry the crane over this until he got on solid bottom. Unless there had been an engineer there at the time that could not have been done. That is one instance. Then, we found it necessary to give modified instructions to the contractor. The plan was to put down the blocks right up, and the heavy monoliths on the top; but, finding the bottom to change, I directed the contractor to go on putting down the blocks, and to allow them to settle before putting on the top. I believe, if an overseer had been in charge of the work, he would have gone on in the same style on that bottom; and the result would have been, when the blocks subsided, the heavy monoliths would have toppled over, and a very heavy extra cost been entailed.

*Mr. J. McGREGOR*, Engineer-in-Charge of the Oamaru Harbour Works, re-examined.

605. *The Chairman.*] You have stated that the breakwater at Oamaru is not at present costing more than £70 per foot?—Not quite £70. About £67 19s. 9d.

606. What would be the increased cost of a breakwater, if increased 5 feet in height on account of the extra range of the tide?—I think about £11 per foot.

607. On that assumption, the work at New Plymouth would cost about £80 per foot with that additional height?—Yes.

608. And that is also on the assumption that cement and other materials cost the same in both places?—Yes; it would be similar.

609. Then, if cement and other materials cost 4s. to 5s. per cubic yard additional, at New Plymouth, how much would that add—approximately?—I cannot give it at the moment, but it can be easily worked out.

610. Well, if cement and other materials cost 4s. or 5s. per yard more at New Plymouth than at Oamaru, the cost of concrete per foot run would be considerably greater?—Yes.

611. *Mr. Moss.*] You have been working at these works at Oamaru a long time?—Between nine and ten years.

612. Have you ever found it necessary to deviate much from your original plans, or to make changes of any kind?—Oh, yes; though not any very great changes. The general design has always been preserved, but a good many details have been modified.

613. Could that have been done without professional or skilled supervision? Could a clerk of works have done that?—The modifications were the result of careful observations, and careful watching of the action of the sea on the works as they progressed. The modifications were devised to meet contingencies, as they arose. The nature of the bottom has played an important part in the alterations to the design.

614. Is it usual to carry out heavy works of this kind without skilled professional supervision?—Certainly not. I never heard of such a case.

615. Would you consider it right to intrust the prosecution of the New Plymouth Harbour Works to the charge of a clerk of works—merely an overseer, who is not a professional?—Certainly not. No man with that training could meet the contingencies likely to arise in a work of that kind.

616. Although he might be a good inspector?—Yes.

617. *The Chairman.*] What has been the average cost per lineal foot of the Oamaru breakwater, for the 1,350 feet completed last December?—£82 16s.

618. And the 1,475 feet complete to date?—£80 11s. The cost is somewhat reduced, as the work has advanced, because present prices are somewhat lower.

619. What was the amount of work executed, when the Oamaru Board had expended about £70,000?—We had the railway made from the shingle beach to the breakwater, had all the plant requisite for the work, and about 700 lineal feet of the breakwater was constructed.

620. What are the relative values of clean shingle from the beach as compared with crushed stone, for concrete?—Shingle costs about 2s. 6d. per yard. I am of opinion that stone taken from quarries and crushed by machinery would cost about 4s. per yard.

621. In which 2s. 6d., in your case, I think, you include certain tramways?—The contractors make their own tram to the shingle beach. The cost was a little more there, perhaps, than it would be in other places, for this reason: The contractors have to send out ten or twelve men with the trucks, which are brought in by the Government locomotive; and thus a good deal of time is wasted, which would not occur if the contractors brought them in themselves. The trucks go over the ordinary line, and are hauled by the Government engine.

621A. The cost would have been less than 2s. 6d. if the tram had been provided for the contractors?—The tramway is provided, but the haulage is not.

622. The Government haul in the trucks?—Yes.

623. At New Plymouth, the Board will have to construct its tramways to these quarries. The tramways for the shingle at Oamaru, I understand, are provided by the contractor?—From the main line.