

and knowledge, though in some respects results have shown they failed to do some of the things which were essential. At the same time it cannot be properly said that any evidence has been shown of deliberate neglect on the part of the Public Works construction staff, most of whom were grossly overworked; nor of any deliberate slumming on the part of the contractors. As a matter of fact, the conclusion of the work is said to have been followed by mutual congratulations between all concerned on the satisfactory results of their efforts, thus indicating their general opinion that all was well.

CRACKS

On page 2 of the report will be found an account of the discovery of cracks in Fordell Tunnel and the action taken to acquaint Head Office and the District Engineer with the position.

The following observations are made :—

- (1) The Assistant Engineer in charge was at first of the opinion that the cracks were due to earthquake action, but, notwithstanding this, he did make regular reports from November, 1938, until June, 1939, when he suggested that remedial action should be undertaken :
- (2) The Resident Engineer forwarded reports of the Assistant Engineer in charge regularly, and, in the case of the June, 1939, report, accompanied it with a sketch of two alternative proposals for strengthening the tunnel :
- (3) The District Engineer, Stratford, also forwarded to Head Office the Reports he received, but he does not appear to have become unduly alarmed, and in forwarding the June, 1939, report he even suggested that remedial action could await completion of the Turakina Tunnel some fourteen months later :
- (4) In spite of reports showing progressive deterioration, Head Office mind is indicated by its reply in July, 1939, which really said, "Wait and see" :
- (5) It was not until July, 1939, that the opinion was expressed that the cracks were due to lateral pressure :
- (6) During the course of construction, bulging in the side legs occurred, and this should have made it evident that lateral pressure existed :
- (7) It was not until 23rd March, 1943, that mention was made of cracking in the Turakina Tunnel.

It does therefore appear that there was an entire lack of appreciation of the seriousness of the cracks, both in Stratford and Wellington, and everywhere a failure to attempt a diagnosis of the case to the extent really warranted. Had this been undertaken, as should certainly have been done, when the reports of January, 1939, showed the cracks extending, remedial measures could have been undertaken in both Tunnels in time to have made a substantial saving in money.

At the time (1939) the opinion was expressed that the cracks at Fordell were due to lateral pressure, there was still eleven months of construction to complete Turakina, and though it is considered that a proper investigation should have disclosed the position much earlier, a change, if made even at that late hour, could have still made a very large saving in public moneys.

The conclusions reached may be best indicated in relation to the headings of the order of reference :—

- (1) *What system obtains in the Department for the recording of discussions on projected works and of decisions taken at these discussions.*

The normal procedure leading up to projected works like the Turakina deviation were stated by the present Permanent Head of the Public Works Department in his evidence. After the passing of the Authorization Bill an instruction would be received from the Minister to proceed with surveys. In the case of railway deviations these would be carried out in conjunction with the Railways Department. First comes the reconnaissance survey indicating the best route to adopt. A report is made to the Minister, the Engineer-in-Chief discusses the project with the Minister, and a decision is made to carry out a trial survey. Alternative routes may loom largely, but if the issue is clear the matter would usually be submitted to the Minister for decision by Cabinet, and the Department would then receive authority to proceed with the permanent survey, which would be carried out at the same time as estimates are compiled for inclusion in parliamentary estimates. A decision is then given to proceed with the work.

The practice in Head Office is for verbal discussions to take place between the Engineer-in-Chief, the Assistant Engineer-in-Chief, and the Inspecting Engineer at several points in the foregoing procedure. It is customary for any decision of importance to be recorded by a minute on the file or by inclusion in a memorandum to the Minister or to the District Engineer. This was accepted as proper practice by the Permanent Head, the previous Permanent Head, and the previous Inspecting Engineer. It was carried out in connection with the South Island Main Trunk.

The lack of record of the discussions and decision to use the amended tunnel section in this case is definitely admitted by the present Permanent Head in a minute of 22nd September, 1943 addressed to the Designing Engineer in the following terms—

"This is the only correspondence which can be found regarding the amended tunnel section. It does not throw any light on how it came to be used at Turakina."

The Permanent Head is obviously as surprised as were the members of the Inquiry at the absence of any record of the decision and discussion concerning the tunnel.