

Next in order of culpability is the District Engineer, Mr. Lindup. Due to the fact that he was working under the general direction of the Inspecting Engineer, and that certain vital decisions had been made in Head Office without apparently consulting the District Engineer, his share of blame is considerably less than Mr. Sharp's.

He failed—

- (a) By failing to record important decisions and in accepting verbal instructions of major importance without noting same on file.
- (b) By failing to take action when the class of country encountered was found different from expectations.

NOTE.—Under this heading the District Engineer must share with the Inspecting Engineer the responsibility in the points quoted below. Had the District Engineer taken proper action as he should have done, the lack on the part of the Inspecting Engineer in these particular matters could have been corrected.

(i) Failure to insist that proper plans and specifications were provided giving clear details which would ensure the proper strength of the lining, and containing specific instructions concerning the thickening of the wall if the country was not such as was anticipated, and at a later date these were promulgated to the supervisory staff.

(ii) When the country was subsequently found to be different from anticipations, in not seeing that the strength was increased proportionately, and in not stressing this point when reporting to Head Office.

(iii) Issuing instructions for the adoption of the type of timbering shown on the timbering plan which in its terms did not reasonably permit of filling the crown especially with the plant made available; and in taking no steps to remedy the position.

- (c) By failing to exercise closer and more effective personal supervision. Had this been given he must have been aware of the weight on the timber; and also that the arch was not being constructed satisfactorily.
- (d) In failing to ensure that adequate supervisory staff was allotted.
- (e) In failing to make sufficient effort to diagnose the causes of the cracks at an early stage and to recommend remedial action soon enough.

It is considered that the Resident Engineer, Mr. Sampson, is blameworthy to a limited extent under the same headings as the District Engineer. But the fact that he lacked tunnelling experience and that he placed this on record in the early stages does substantially reduce his share of responsibility, though thereby there was left an undue burden of responsibility on the shoulders of the Assistant Engineer in Charge. It should be noted that Head Office acquiesced in this.

The Assistant Engineer in Charge, Mr. Annand: Ordinarily the Engineer in charge would carry a very large share of the responsibility for the trouble, as both the District Engineer and the Inspecting Engineer should have been able to rely on him to call their attention to most of the matters wherein they are deemed to have failed. The circumstances, however, are not ordinary. Mr. Annand is not highly qualified academically, and this was known to all concerned. The Committee formed the opinion that he is a man who could manage a job but would need instructions in substantial details on the design to be used. The decision as to type of tunnel section was made in Head Office, and he received only verbal instructions on the method to be used, and neither proper plans nor specifications. In addition, he was not the Resident Engineer, but had one located at Wanganui.

His main protection, however, lies in the lack that existed of sufficient supervisory staff. He was required to undertake other duties which made it impossible for him to give adequate attention to what was taking place in the tunnel, and things happened of which he should have been aware, but was not, and in the opinion of the Committee, could not.

He should be blamed—

- (a) For failing to see that proper specifications in writing were supplied to the parties:
- (b) For failing to ask for further supervisory staff and for seeing that the overseers and foremen understood what was expected of them:
- (c) For failing to ensure that instructions issued by his superior officers were clearly transmitted to supervisory staff.

Overseer Ryan, Turakina Tunnel, and Sub-Overseer Thompson, Fordell Tunnel: They are both to be criticized for relying too much on the foreman without seeing that they were adequately instructed, and without ensuring that they fulfilled the duties expected of them.

Against this, however, their time on tunnel supervision was limited by having to travel on foot from one face to the other, and in having duties other than the construction of the tunnel.

In Mr. Ryan's case he was absent on sick-leave for some six months during the construction of Turakina Tunnel.

Foremen: There was considerable variation in the responsibility as understood and carried out by the four foremen.

In general terms their main fault was a lack of uniformity in understanding the requirements of the tunnel construction.

The personal performance of the foremen may be summarized:—

Mr. Storey, South End, Fordell: Since deceased.

Mr. McDonald, North End, Fordell: Unsuitable for position of foreman. Did not understand requirements and was not aware of happenings of which he should have known.