

- (2) *In whose hands does the authority lie for making final decision for the plans and operation of approved major works? Is such authority delegated by the Engineer-in-Chief to responsible senior officers, and, if so, to what extent?*

There is no doubt but that the responsibility for making final decisions for the plans and operations of approved major works lies in the hands of the Engineer-in-Chief. The practice is for the Engineer-in-Chief, the Assistant Engineer-in-Chief, and the Inspecting Engineer concerned to work as a "team." Considerable authority is delegated to the Assistant Engineer-in-Chief and to the Inspecting Engineer, but even if the Engineer-in-Chief is absent from Headquarters with the Minister or otherwise it is expected he shall be kept apprised of decisions of importance and of any other matters deemed of sufficient weight.

In the case under consideration there was a conflict of evidence between the then Permanent Head and the then Inspecting Engineer. The Permanent Head has no recollection of any discussion concerning the adoption of the particular tunnel section, but will not swear that no discussion took place. The Inspecting Engineer insists the matter was discussed. Unfortunately, the Assistant Engineer-in-Chief is now deceased. The circumstances therefore emphasize the necessity for a proper record of all important decisions, and the officer who needed the protection of a record—the Inspecting Engineer, who would issue the district instructions and supervise the work—is, to say the least, very unwise in that he did not acquire the protection of committing the decision to writing.

The members of the Inquiry find it hard to believe that no discussion took place involving all three administrative officers.

- (3) This question should be dealt with in two separate sections:—

- A. *In this particular case who was the officer responsible for the adoption of the tunnel section used on this job?*

The answer to this question is seriously complicated because of the three who would normally share the responsibility, one (the Engineer-in-Chief) does not remember being consulted, the second (the Assistant Engineer-in-Chief) is dead, so that the inquiry had to rely mainly on the evidence of the third—the Inspecting Engineer—with the limited information available on the files.

The conclusion reached was that Mr. Sharp, the Inspecting Engineer, carried a substantial share of the responsibility. It was he from whom the District Engineer received his tunnel instructions, and it was he who supervised the work for Head Office. On various occasions when questions were raised by the District Engineer he was advised, "Mr. Sharp would discuss the question on the spot." It is also clear that the decision was entirely a Head Office one.

In his favour should be said that the new section had been accepted as a standard one, notwithstanding that it had been used in New Zealand only once previously, on the Gisborne line, and that in a special class of country. Further, the instruction to the District Engineer to commence work on the deviation was dictated and signed by the Assistant Engineer-in-Chief, the late Mr. Baker.

If, therefore, there is any unfairness to Mr. Sharp in assessing his responsibility so highly, it is a decision to which he has left himself open by his failure to maintain adequate records of discussions and instructions, but on the evidence given, and from examination of the files, no other conclusion could be reached.

- B. *Was any consideration given to the fact that the class of country to be tunnelled was entirely different from that encountered where this tunnel section had previously been used, and, if so, were any factors to compensate for the different class of country considered?*

On the evidence available the conclusion is forced that no serious consideration was given to the class of country likely to be encountered. There was an assumption that sandstone and papa would be met, but the Inquiry was certainly not satisfied that the assumption was one the Department was entitled to make. The Departmental Geologist was not consulted; no adequate field investigation was made on the point, whereas there are indications in the surrounding country that the probability of striking sandstone and firm papa was quite unlikely.

The surprising factor is that, although quite early in construction it was obvious to all concerned that the country was quite different from that stated to be expected, no one considered it necessary to make any modification to provide adequate strength. On the contrary, approval was given to the boarding-up of the "C" legs, which had the effect of restricting the thickness of concrete, thus providing less than was used on the Gisborne line, where the country encountered was hard rock. Moreover, no special precautions were taken to get commensurate thickness in the arch and to ensure this being solidly filled to the full extent of the excavation.

- (4) *What measure of supervision was exercised over the job, and by whom? Assuming its inadequacy on the results shown, whose responsibility was it to see that adequate supervision was provided and exercised?*

The Head Office supervision of the work was carried out by the Inspecting Engineer, who visited the job about once in three months. The main engineering supervision was left to the District Engineer, whose headquarters were at Stratford. He visited the tunnel frequently in the early stages, as often as once in two or three weeks, less frequently later. In this district there was for most of the period of construction a Resident Engineer at Wanganui. It would be