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NEW ZEALAND.

MIDLAND RAILWAY.

REPORT OF COMMITTEE OF ENGINEERS APPOINTED TO CONSIDER THE FEASIBILITY OF WORKING THE PROPOSED LONG TUNNELS ON THE STEEP-GRADE INCLINE BETWEEN OTIRA AND ARTHUR'S PASS.

Laid on the Table by the Hon. Mr. Hall-Jones, with the Leave of the House.

Public Works Department, Engineer-in-Chief's Office,
Wellington, 11th October, 1898.

The Hon. the Minister for Public Works.

WE have the honour to report that we have very carefully considered the question, referred to us, of the possibility of working the tunnel 1,170 yards long proposed as an alternative to the switch-back. After full consideration we have unanimously agreed that we cannot recommend the construction of a tunnel of this length on a grade of 1 in 15. It is certain that locomotives generating their own power by the combustion of coal could not be successfully worked in such a tunnel under all conditions, in view of the difficulties experienced in the relatively short tunnels on the Rimutaka Incline, and also in view of the great difficulties experienced in working tunnels of half the length of the proposed tunnel on the Abt lines in Japan. We are aware that improvements in incline locomotives, by which all or a portion of the steam is condensed instead of being discharged into the tunnel, combined with improvements tending to insure better combustion, are likely to render the working of tunnels on very steep gradients somewhat easier than has been the case in the past. It is also probable that the combustion of liquid fuel would still further diminish the difficulties now experienced in such tunnels; but, as no very reliable and definite results are at present available, we are unable to recommend the adoption or trial of any of these means of rendering the tunnel more easily worked.

It can be contended that, if natural ventilation failed, recourse can be had to artificial ventilation, but we think the cost of installation and working, and the probability of the variable efficiency of the plant under differing atmospheric conditions, are so great that no proposal for working the line by means of artificial ventilation can be entertained.

A careful examination of the plans, &c., of the various surveyed lines shows that the following alternatives are feasible, in addition to that of simply reverting to the switchback line as originally proposed by the company:—

A. It is possible to locate the line on the left bank of the Rolleston, and get a line some 30 chains shorter than the alternative tunnel line proposed by the Midland Railway Company, with a tunnel about 850 yards long on a grade of 1 in 50, with no sharper curves than 10-chains radius. The same number of passing-places can be arranged for by keeping the 1 in 15 some 20 chains or more on the hillsides, instead of running along the Otira River bed as is now proposed. This alternative line will be about 24 chains shorter than the switchback line, exclusive of the length of the switchback itself. It will run on the hillsides for a length of 60 chains beyond the point where the company's line reached the bed of the Otira. Without a very careful examination of the ground it is impossible to say whether this would be a serious disadvantage or not. In the one case the line will perhaps be more liable to damage by slips; in the other it will be liable to damage by the Otira floods, and heavy protective works will be required to secure the railway bank.

The special works on this line would be a bridge over the Rolleston, and the tunnel, 850 yards long. There would also be bridges over several minor creeks, and heavy earthworks.

Including running in and out of the switchback, there would be nearly half a mile less of distance to be traversed between the Bealey and the Otira Stations by this line than by the switchback line for trains with engines at each end; while for trains with single engines there would be the additional saving of time required for the engine and van to change ends on the switchback.

The long tunnel being wholly on a flatter grade—say, 1 in 50—than the rack or Fell incline, and without the centre rails, trains would be hauled through it by the adhesion engines of the locomotives only, and the working of the tunnel would present no greater difficulties than is experienced in other long tunnels on New Zealand railways, as, for instance, the Deborah Bay Tunnel, 1,400 yards long, of which a length of 1,100 yards is on a grade of 1 in 60, or the Spooner's Range Tunnel, 1,474 yards long, of which a length of 979 yards is on a gradient of 1 in 44.