

The train was then four minutes late according to its schedule, having gained four or five minutes on the twenty-three minutes allowed on the Marton-Turakina section and having made the run in one or two minutes less than the time allowed for the New Plymouth express.

There is, however, nothing in the recorded times of W 4 to indicate that, although time was lost and made up at different stages of the journey, the maximum speeds authorized by the Working Time-table were at any time exceeded on the journey between Wellington and Turakina.

OPERATING CONDITIONS BETWEEN MARTON AND POINT OF DERAILMENT.

For the sake of convenience we refer throughout this report to the point 27 ft. south of mile 131, at which the evidence indicates that the engine left the rails, as "the point of derailment." This does not imply that the cause of the accident was a simple derailment in the ordinary sense of the term. As will be seen later, the preponderance of evidence establishes that the cause of the accident was the operation of centrifugal force at a sharp curve, which caused the engine to overturn. The derailling of the engine was only an incident of the overturning, and was not the primary cause of the accident.

From Wellington to Marton the conditions of operation call for no special comment. From Marton onward, however, owing to grades and curves, the line becomes more difficult. Maximum speed limits are prescribed between Marton and Fordell, those applicable to express, mail, and passenger trains being as follows :—

	Miles per Hour.
Marton to mile 124, chain 20	45
Mile 124, chain 20, to mile 124, chain 70	30
Mile 124, chain 70, to mile 140, chain 60	35

In addition to the maximum speed-limit, a permanent speed-restriction to 25 miles per hour applies to all curves of less than 9 chains radius, and special further speed-restrictions to 20 miles per hour are imposed between mile 127, chain 60, and mile 128, chain 60, and between mile 130, chain 70, and mile 131, chain 30, where combinations of curves and grades occur. The accident occurred on a 6·4 chain radius curve, 27 ft. south of mile 131—that is, just after the train had entered the length covered by the last-mentioned restriction.

From Marton the line rises for about two miles, and then falls continuously for about eight miles to Turakina (mile 127, chain 13). The steepest grade is of 1 in 50, from mile 124 to mile 125, and the sharpest curve is of 14 chains radius.

Running through Turakina a speed of 35 miles per hour is permissible, but a train may be checked somewhat to facilitate the picking-up of the tablet. Moreover, a curve of $8\frac{1}{2}$ chains radius is met approximately 27 chains from the centre of Turakina Station. This curve is, of course, covered by the general restriction to 25 miles per hour that applies to all curves of less than 9 chains radius. Seven chains north of the end of this curve (at mile 127, chain 60) the first special speed-restriction to 20 miles per hour takes effect for a distance of one mile. The length covered by this restriction rises sharply up grade ranging from 1 in 44·6 to 1 in 56 to the summit (mile 128, chain 55), and includes curves of 10, $5\frac{1}{2}$, 12 (2), $8\frac{1}{2}$, 5, 8, 7, and 9 chains radius. The special speed-restriction ends at mile 128, chain 60, 5 chains north of the summit.

From mile 128, chain 55, through Ratana, and to the 6·4 chain radius curve at which the accident occurred the line is practically straight, being broken only by two very short curves of $13\frac{3}{4}$ chains and 80 chains radius respectively. It descends in comparatively easy gradients, and there is a length of about 13 chains of level track before the 6·4 chains radius curve is reached. With the exception of a short stretch of 5 chains between mile 128, chain 55, and mile 128, chain 60, this practically straight length of approximately 2 miles 15 chains is covered, as already stated, by a maximum speed-limit of 35 miles per hour.

The second special speed-restriction to 20 miles per hour to which reference has been made applies from mile 130, chain 70—that is, from 633 ft. south of the point of derailment, to mile 131, chain 30. Between miles 131 and 132 the line falls sharply down a grade of 1 in 38·5, with a close succession of curves, one being of 6 chains radius.

It appears that the maximum speed-limit of 35 miles per hour that applies to the straight and easy stretch between mile 128, chain 60, and mile 130, chain 70, must be considered together with the restriction to 20 miles per hour from the latter point, which has relation to the sharply curved and steep descent from mile 131. Apart from the existence of the steep and tortuous grades at both ends, there would be no necessity for imposing a maximum speed-limit of 35 miles per hour for a straight and easy stretch over two miles in length.

The 6·4 chains radius curve is marked by a radius board bearing the figure 6, which is placed approximately at the commencement of the transition curve leading to the true curve.

The special speed-restriction of 20 miles per hour commencing at 130 miles, 70 chains, is marked by a large speed board, the visibility of which under night conditions was tested from the footplate of an engine by departmental officers, and was also checked by members of the Board of Inquiry. On a dark night which was, however, free from mist or fog the board first became clearly visible at a distance of 1,070 ft. At shorter distances the board and the lettering thereon were partly obscured by a telegraph pole and by the shadow cast by the telegraph pole, but the board itself was continuously in view from the time at which it first became visible. The speed board is placed in a position 6 chains 49 links north of 130 miles, 70 chains—that is, its position does not coincide with the commencement of the length of line that it is intended to protect. This circumstance is, in the present case, merely a matter for comment, for the position of the board had no bearing on the happening of the accident to train W 4.