

compliance with the instructions contained in the Working Time-table the driver should not have driven over the Ratana Flat at a speed in excess of 35 miles per hour. He considered that he was travelling at 40 miles per hour, which would not, in fact, have been a dangerous speed. He ought to have exercised prudence and reduced speed considerably when he ran into a bank of fog at a position which he estimated to be half a mile beyond Ratana, but which actually was about three-quarters of a mile beyond that station. At this time he was looking out for the speed-restriction board near the 6-4 chains radius curve, but did not expect to see it until he had proceeded for another 50 chains. He did not, in fact, see the speed board at all, owing to the bank of fog reducing visibility to a distance of about a chain, and possibly, also, to his having turned his head for a moment to give an instruction to his fireman. The driver made a short, light application of the brakes when he thought he was about 30 chains from the curve, but this application was, in fact, insufficient to effect a substantial reduction in speed. At that time the engine was within 200 ft. of the point of derailment, and the derailment occurred almost immediately after the brakes had been released.

Engine-driver Percival is a steady, competent, experienced driver, with a first-class record. We do not consider that he was guilty of culpable negligence, but we are of the opinion that, though he admittedly travelled over the Ratana Flat at a speed that he himself estimated to be 5 miles per hour in excess of the maximum authorized speed of 35 miles per hour, his miscalculation of his speed and location when he was within 200 ft. of the point of derailment was due to an honest error of judgment, to which the presence of haze and fog contributed. His failure to reduce speed considerably as a measure of prudence when the train ran into a bank of fog is attributable to the same error of judgment, which led him to believe that he was then at least 30 chains from the curve.

(3) *Question* : Generally, are there any circumstances in connection with the said derailment which call for comment, particularly in respect of the said rolling-stock and the permanent-way in the locality of the derailment ?

Answer : We are satisfied that the engine, cars, and guard's van were in first-class order and condition, and that the permanent-way was well laid and maintained and perfectly safe to travel over at the authorized speeds.

(4) *Question* : What steps (if any) might be suggested to prevent a recurrence of a similar derailment ?

Answer : In view of our finding that the derailment was primarily due to an error of judgment on the part of the driver as to the speed at which the train was travelling, the only suggestion that we can properly offer in answer to this question is in regard to the equipment of locomotives with speedometers. We deal, however, in the next section of this report with a number of suggestions in respect of other matters which can more properly be considered apart from the specific question that we are now required to answer. Our comments and recommendations on the suggestion regarding the equipment of locomotives with speedometers are as follows :—

The Board has considered the question of equipping locomotives with speedometers or, perhaps preferably, speed-recorders. A speed-recorder is an instrument which combines the functions of a speedometer and a recording-device.

Considered only in the light of the statements made by experienced locomotive-drivers in the course of the inquiry, it might be concluded that there was no very strong reason and no urgent demand for such equipment.

On the other hand, the official attitude of the New Zealand Locomotive Engine-drivers, Firemen, and Cleaners' Association is definitely in favour of fitting speedometers. The association has recently made appropriate representations to the Department, and its views are entitled to respect. Those drivers who were called upon to give evidence expressed confidence in their own ability to judge speed within about plus or minus 2 miles per hour. If this could be accepted as representative of the average engine-driver's ability to judge the speed of his engine in terms of miles per hour, the case for expenditure on the purchase and maintenance of speedometers would have little to support it.

However, in everyday practice trains must frequently operate under conditions prejudicial to any rapid and accurate judgment of speed, such as the strict observance of restrictions over difficult sections necessarily demands. It is certainly open to question whether even the most experienced men can judge their instantaneous train-speed with any approach to accuracy under unfavourable conditions of, for example, storm or fog. We incline to the view also, that the expectation of accuracy of judgment within a margin of 2 miles per hour either way is too optimistic for general acceptance, even under fairly good conditions and in daylight.

Confirmation of this view is found in the report on a recent very disastrous accident on the East Indian Railway. The Judge (Sir John Thom) who held the subsequent inquiry found that the train was travelling in the region of 55 miles per hour over a section having a speed-restriction of 45 miles per hour, and commented as follows :—

" It would not be reasonable in the circumstances to hold that the driver of the train was culpably negligent in that he was driving at an excessive rate of speed. It is a matter of general admission that without a speedometer it is impossible for a driver to regulate his speed exactly.

" Some witnesses have deposed that it is impossible for a driver to determine within 5 miles an hour what the exact speed is. One witness has said that it is impossible to determine the speed within 7 miles an hour, and another, within 10 miles an hour. There can be no question that it would be quite unreasonable to expect a driver, especially at night, to maintain an exact speed of 45 miles an hour. He might be travelling at 50 miles an hour or over, and yet be under the impression that he was well within the restricted speed. . . . "