

We are led to this conclusion by the very satisfactory results obtained in practice, by its reliability, and by its low cost of maintenance, and because this brake may be used as a service brake, only requiring, to convert it into an emergency brake, a quicker application, which would be the instinctive action of a motorman in the event of a sudden emergency arising; and also because the brake is applied by the use of the same handle on the controller as is used to apply power to the motors. The motorman's hand is always on this handle, so that he has nothing to do in applying his emergency brake but to turn it quickly. The use of the brake in service keeps the motorman practised in its use.

We consider that the essentials of a tramway brake are,—

- Reliability;
- Simplicity of application;
- Quickness of application;
- A minimum of physical exertion.

These conditions the evidence shows are entirely met by the Newell Magnetic Brake. Simplicity of action is necessary to avoid risk of confusion, whilst undue physical exertion causes fatigue and, in consequence, laxity of vigilance.

We found that several types of controllers are in use, requiring different movements for the application of the emergency brakes. This we consider a source of danger, as liable to confuse a motorman when successively using the different types.

Many complaints were made as to the inefficiency of the sand-gear, which, being a necessity for the efficient working of the brakes, was made a subject of inquiry. The principal fault appeared to be caused through clogging of the sand in the delivery-pipe by water thrown up by the wheels. As this fault exists to a very small extent in Wellington, we have concluded that the coarse, sharp sand used there, although obtained from the sea-beach, accounted for the better efficiency. The fine sand in use in Auckland is more likely to cause clogging, while at the same time it is not so good as a coarser sand for increasing the adhesion of the wheels. Considerable difficulty in working the sand-gear was observed, which could be easily remedied by closer attention to and slight improvements of the gear.

The motorman's gong and the sand-gear are worked by pedals not in view of the motorman. It is advisable therefore that the relative positions of these pedals with regard to the usual standing-place of the motorman should be the same on all cars, so that he would make no mistakes in using them. We found that the relative positions varied on some of the cars.

(c.) We found that the company had fitted up a skeleton car in the barn at Ponsonby, for the purpose of instructing the motormen. This car is fitted in such a way that all the faults which occur in practice can be reproduced, and their detection and remedy explained. Mr. Brenand, the superintendent of rolling-stock, regularly conducts lectures, explaining, with the use of the equipment described and a blackboard, the whole of the working of the car.

Practical teaching on the road is conducted by old and experienced motormen for periods varying with the ability of the learner. On the completion of the two courses an examination is held, on passing which the man becomes a fully qualified motorman and is allowed to take charge of a car.

The motormen subpoenaed as witnesses appeared to have an intelligent knowledge of the equipment of a car and its use, showing that they had been properly trained.

(d.) The evidence, together with our inspection, clearly shows that the maintenance of the rolling-stock has been very much neglected, which could not have happened to the same extent if the undertaking had been regularly subject to Government inspection. It might be urged as an argument against Government inspection that it is unnecessary when the maintenance is properly attended to; but we are of opinion, even in instances where maintenance receives the most careful attention, that Government inspection will do good by assisting to keep the maintenance at its high standard.