THE MELBOURNE AND METROPOLITAN TRAMWAYS BOARD.

S T A T E M E N T
BY THE CHAIRMAN TO THE COMMITTEE OF PUBLIC
ACCOUNTS OF THE PARLIAMENT OF THE STATE OF VICTORIA.

In reply to the questions submitted to me by letter from the Secretary of the Committee dated 26th September last, I have the honor to reply generally thereto as follows:—

The Cable Tramway System of Melbourne originally consisted of 44 miles of double track with all necessary Power Houses and Rolling Stock. This system was laid down by a special Trust formed by 13 municipalities, and leased to the Melbourne Tramway and Omnibus Company for a period of approximately 31 years at an annual rental on a prescribed scale which, with the accumulated interest on the investments thereof, would be sufficient at or before the expiration of the Company's lease to extinguish the debenture indebtedness of the Trust. In addition, there existed in Northcote a small cable system, 2¼ miles in extent, which had in the first instance been built by a private Company and which failed. Its assets were seized by the mortgagee thereof, and were ultimately disposed of to the Northcote Council.

Upon the inauguration of the present Board in November 1919, the Melbourne Cable System passed to it. Between the expiry of the Tramway Company's lease and the Board's inauguration, the system was operated by a temporary Board designated the Tramway Board. The Northcote cable system became vested in the Board in February 1920, pursuant to the provisions of the Board's Principal Act.

One of the powers directly conferred upon the Board by its Principal Act was to convert any Cable tramways or part thereof under the management into Electric tramways (Vide Section 53 (f) Act No.2995.)

In the course of the Board's investigations for the preparation of a General Scheme for the future development of the tramways for the service of the Metropolis, as required by Section 34 of the above Act,

it became obvious that the systematic conversion of the Cable system to Electric traction must be an integral part of such General Scheme. Accordingly, the merits and demerits of the Cable system were investigated as well as various types of Electric tramways, such as the conduit and surface contact systems and petrol-driven and battery-operated cars.

The result of these investigations are set forth in an interim report of the Board dated 10th September, 1922, of which I produce a copy (Copy handed in.)

The Board's experience since the date of this report, both in regard to the difficulties in the operation of the Cable system in the central part of the City and the greater reliability and flexibility in the operation of those Cable lines already converted to Electric traction, fully justifies the opinions expressed in the interim report referred to.

The main features affecting the reliability of the tramway system on the mechanical side are —

(a) POWER SUPPLY.

(b) GEAR FAILURES ON INDIVIDUAL CARS.

As to (a) - On the Board's Electrical system, for the last financial year, the total delays through failure of power supply amounted in all to 10 hours 14 minutes, of which 4 hours 7 minutes were due to the failure of current by the power suppliers, and therefore outside the Board's control.

The Board's sources of power supply are:-

(1) State Electricity Commission.
(2) Melbourne Electric Supply Company.
(3) Melbourne City Council (in respect of the Rathdown Street Cable Power House and the Melbourne-Brunswick-Coburg Electric Tramway system.)

The failure of power supply from any one of these sources naturally would cause a stoppage in the area deriving its power from the particular system where the failure takes place.

The above figures include delays due to overhead line faults.

As against this the number of stoppages on the cable system were 480, giving a total delay of 69 hours 33 minutes. Of these 285 were due to rope defects, 3 to electric power failures, which also affected the electric system as above.

The car mileage lost on the electric system, excluding Footscray, represented only .0123, or equal to one in 8,000 in the total mileage run.

As to (b) - One would be inclined to expect that the electric car, carrying its own motive power and operating at a high speed, would be less reliable than the cable car. This, however, is not borne out by results. Over the whole electric system about 16 cars on the average were changed over for defects during the past year per 100,000 miles run. This number is annually decreasing. On the cable system the number was approximately 17. The main causes of trouble on the cable cars are due to wheels (which are made of chilled cast-iron), damage to grips, and damage by collisions.

To some extent the cable system suffers in comparison owing to its running through the crowded streets in the City and the busy and narrow streets in the inner suburbs.

Since the electric system came into operation in Swanston Street it is a notable fact that the number of accidents has decreased. Last year, according to the Traffic Department's figures, there were 308 collisions and 144 derailments on the cable system and 311 collisions and 44 derailments on the electric system.

In view of the greater traffic mileage and car mileage on the electric system, the comparison is in favor of the latter; the more so when the high speed of the electric car is taken into account. The comparative immunity from accidents is of course due to the simpler control of the electric car.

One of the greatest disadvantages of the cable system is its inflexibility in the matter of extensions and the routing of the services.

Extensions to the existing lines cannot be made on the same piecemeal basis as with electric lines at anything like the same cost.

The cost of the track with the necessary tunnels, underground arrangements for the ropes, and the mechanical difficulties of pulleys at curves, with the division of the routes into suitable lengths or sections for rope operation, is very much greater than it is with electric traction. After certain points have been reached, additional power houses are required, and although these may correspond in part with the substations used for electric traction, they are much more costly to construct and maintain for the same power demands made upon them.

The outer areas can only be developed on the basis of a cheap track construction. In the initial stages, single track is used with suitable loops arranged along the route so that cars operating in opposite directions can pass one another. It is absolutely impracticable to arrange for extensions of cable tracks on the single line and loop basis. Either double track must be constructed, or none at all.

It is to be remembered that the cable system was confined to a radius of approximately four and a half miles from the centre of Melbourne. A number of electric lines serving the suburbs had been built up from or around the terminal points of the cable system, and the Board was faced with the problem of finding city terminals for these electric lines so that passengers could have the proper transit facilities through to the City without change of cars.

In the Southern districts, there were the Malvern lines serving large closely settled districts without direct connection to the City. Since the conversion of Swanston Street a number of these lines have been through-routed to the City which has been a great boon to the passengers concerned.

The same applied and still applies in the East, embracing Hawthorn, Kew and Camberwell. Both the Victoria Street and Richmond lines junction with electric lines. There is congestion at peak hours at these connecting points, and great inconvenience is suffered by passengers through having to change from one system of trams to another. The Richmond line is in course of conversion. Preparations for the conversion of the Victoria Street lines are now in hand. When both are converted, this disability will disappear.

In the Northern section there was the Essendon system which terminated at Flemington Bridge, and passengers were compelled to change at great inconvenience and discomfort. The Essendon line now runs through to the City, and the traffic is steadily increasing in a way which demonstrates the advantage of through-routing.

Apart from the need of through-routing and the development of the metropolis by a unified system of street transportation, the cable system has many inherent disadvantages, the principal of which are referred to in the interim report above mentioned.

Mechanical considerations, for instance, make it impracticable to have a continuous rope from one end of the route to the other. Each route must be divided into rope sections. There is a point of discontinuity between these rope sections and cars must bridge the gaps by momentum, that is, the gripman must throw the rope when cars have sufficient speed to carry them over the breaks. This condition is accentuated at curves. It is not mechanically feasible to arrange for ropes to run round curves. In any case cars have to take the curves at full speed. At street intersections where one rope crosses another, the under rope has to be thrown before the intersection is crossed. At all these points of rope discontinuity, suitable mechanical safeguards are provided to prevent ropes being overcarried, but the want of continuity very materially increases the risk to passengers, pedestrians and other users of the road, as well as damage to the equipment and delays to the service. There are a large number of these points of discontinuity on the cable system, each one of which is a source of perpetual risk.

Before the electrification of any part of the cable system, it was necessary for the Gripmen to throw and pick up ropes on an average of 75,000 times per day, or 25 million times per annum. This work, on the whole, was well done, but notwithstanding the best mechanical devices, accidents and stoppages were frequent.

The following is an analysis of the cable stoppages for the year ended 29th August, 1925, that is, the date the first conversion work was started.

SUMMARY OF CABLE STOPPAGES FOR 12 MONTHS ENDED 29/8/25.

ALL CABLE LINES.

	Loose Wires	Collisions.	Strands & damages by Gripmen.	Engine troubles	Derailments	Obstruction on tracks.	Ropes over-carried.	Power failures - Nth.Carlton	Miscel-laneous.	T O T A L
Number of Stoppages ..	473	95	44	25	34	30	43	6	70	820
Total time in minutes..	916	678	3021	121	423	220	882	527	623	hrs.Mins. 123. 31
Delay- Min.	½	½	1	½	½	1	0	5	1	0
Max.	16	47	440	71	99	34	326	482	55	482

A perusal of this table gives some idea of the disorganization which rope failures and stoppages entail; in fact, through Swanston Street, the stage had been reached when stoppages were almost a daily occurrence, the tramway traffic through the street being in excess of that which could be carried by a system of cable tramways.

At those curves where cars must make the turn by momentum, cars frequently stall and have to be pushed round by hand. Market Street is an example. The curve is located on the top of a rise, and if for any reason the cars fail to make the turn, whether this is due to the heavy loading, failure to throw the rope at the critical moment, or an emergency stop in the curve to avoid an accident, one has the darktown spectacle of passengers leaving the cars and pushing them around the curve.

There was also a noticeable feature at the curve at the Lonsdale Street and Swanston Street intersection. In some cases, a heavy wind

and dirty track were often sufficient to slow up the cars when rounding the curve to a point when they would come to a standstill and have to be pushed the rest of the way round the curve.

The cable service is not flexible. If cars bank up for any reason whatever, it is much more difficult to get these cars into even service spacing again in the case of cable cars than with electric cars. In fact it is often advisable to stop the rope and shut down a line as a whole to save the banking of cars.

It is not easy to short-shunt cable cars in the same way as electric cars are short-shunted. When an electric service becomes disorganized through any cause whatsoever, the Inspector in Charge can direct certain cars to be turned at suitable points along the road where crossovers are located, but with the cable service this cannot be done as it is necessary to get men to open the crossovers and supervise the shunting.

When it is necessary for any purpose to back an electric car which has travelled too far, or after an accident, or when one road is blocked, and it is necessary to maintain service by single line operation, an electric car can be operated without shunting, in the reverse direction. This, however, is not practicable with the cable cars. They must run in one direction, that is, the direction in which the cable travels.

Drivers on cable cars cannot be so readily transferred from one route to the other in cases of emergency or changes in traffic, alteration of routes, etc, as they can with the electric system. The arrangement of ropes, stops, rope throw, rope pick-ups, etc., have to be learnt, and whilst this can be done in a few days, the electric car driver can operate over most routes at the speed at which street cars are operated after running once over the section. This is, of course, only important when one is re-routing a service or transferring men from one Depot to another.

SHUNTING -

Except in a few isolated cases where the grade of the road is suitable almost all shunting has to be done by hand. An example is at the Elizabeth Street terminus of the Brunswick cable cars. The cars from Brunswick, North Melbourne and West Melbourne are shunted at this terminus, and at peak load hours 8 shunters are required to handle the traffic. This number is unable at times to prevent cars banking up to Collins Street.

In Bourke Street, opposite the G.P.O., there is a double shunt, and the grade is just right for automatic shunting, but at peak hours with a strong westerly wind, the rate at which the cars can be shunted is slowed down, and cars frequently bank up to King Street. There is a limit to the service which can be operated on a cable route. When the headway is in the order of three-quarters of a minute at peak hours, the wear and tear on the ropes is greatly increased, and their life correspondingly diminishes.

This condition was most marked in Swanston Street prior to electrification. A rope on this section would only last a period of 13 weeks, as against an average of 39 weeks. The route was the most important in the service and ropes had to be retired earlier than usual to ensure a freedom from failure. On heavily loaded routes, such as Swanston Street, the frequent starting, stopping and slow running of cars was necessary on account of traffic congestion, and the slipping of ropes very materially decreased their operating life. Breaks and strands in the cable were frequent and traffic interruptions long and irritating.

For the twelve months prior to 26/12/25, the date on which the Swanston Street cable line was shut down for conversion, the stoppages in this Street were as follows :-

SUMMARY OF STOPPAGES - 12 MONTHS ENDED 26/12/25.

SWANSTON STREET CABLE LINES ONLY.

	Loose Wires.	Collisions.	Strands and Damages by Gripmen.	Engine Trouble.	Grips Wedged.	Derailments	Obstructions on Tracks.	Ropes Overcarried	Power failures, North Carlton.	Miscellaneous.	TOTAL
Esplanade, Nth.Carlton, Carlton, Toorak, Prahran, St.Kilda, Nth.Melbourne	216	20	32	10	7	10	4	36	7	7	349
Delay in Minutes ..	523	80	2743	121	218	213	37	142	561	23	Hrs. Mins. 77 41
Min. ..	1	1	5	1	7	2	7	0	6	2	0
Max. ..	95	8	440	27	100	78	13	30	482	7	482

The inconvenience to passengers can well be remembered, and the loss in revenue to the Board for the period during which the cable cars along Swanston Street were stopped can be appreciated, but apart from the direct loss, there was an indirect loss of passengers who ceased to patronize the service on account of the risk of stoppages and delays.

There is a systematic inspection and repair of ropes with a view to ensure as long a life as possible.

Along each route there are a number of signal points which connect with the power houses. Inspectors, drivers and conductors can, in cases of emergency, stop the ropes, etc. If a rope is damaged or a grip becomes jammed, or an accident occurs on the road which renders a stoppage of the power plant necessary, a signal is transmitted from the nearest signal box to the Engine House staff.

If a rope is kinked or damaged, then a staff of ropemen inspect it, and make the necessary repairs, but notwithstanding all the precautions that are taken, defects occur, ropes are accidentally stranded and damaged, and delays to traffic follow. These rope stoppages affect all the cars on the route, and the traffic is usually suspended for lengthy periods.

There have been occasions on the cable system which I am pleased to say are rare, when gripmen have found it impossible to release the rope and the cars have careered along the street to the danger of everyone. In such cases, those in charge have to warn the traffic as best they can, and the conductor has to step off at the nearest signal point and send the signal "Stop the Rope" to the Power House and the rope stopped before the car can be stopped.

The speed of the cable service is approximately 9.41 miles per hour, as against an average speed of 11.09 miles per hour for the electric cars.

It has been suggested that the Board could increase the speed of the cable cars by speeeding up the ropes. There are, of course, limitations and objections to this being done. Although the Board has speeded up the cars since it took control of the system, the maximum speed to-day, having regard to street traffic and the braking capacity of the cars, cannot be materially increased. Moreover, the car crew could very properly object to the increase of speed in the absence of power brakes.

The wear, tear and the cost of operating the cable system rapidly increases with the speed, but the more serious problem is the one of public safety, and provision of efficient and suitable brakes on for cable cars.

Track brakes on the dummies and wheel brakes on the trailers, independemtly operated, are now used. The Board has investigated a combined system of braking with a view to a higher speed, but a successful solution of the problem was not found.

Experience has demonstrated that cable cars cannot be operated as successfully as electric cars through congested districts and across city intersections. Prior to the electrification of Swanston Street, the maximum time taken at peak hours to run through Swanston Street from Lonsdale Street to Batman Avenue was 13 minutes, and since the electrification the time has been decreased to 7 minutes.

Another important matter is the one of accidents. Experience shows that there are more street accidents in the centre of the city with cable cars than electric cars. At city intersections, cable cars have to stand well back from the building line. In those cases where a rope has to be thrown before the crossing is made, the distance must be sufficient to permit of the rope being gripped, the car must have had acquired the necessary speed, and the rope thrown before making the crossing; and as the car is practically running at full speed, the accident risk is greatly increased. Electric cars, on the other hand, can approach the intersections quite close to the point of crossing, and when the traffic signal is given, the car starts to cross under its own power, accelerating as may be required to adapt the speed to safe operating.

TABLE SHOWING POLICE RECORD OF ACCIDENTS FOR A YEAR PRIOR TO AND A YEAR AFTER THE CONVERSION OF SWANSTON STREET TO ELECTRIC TRACTION.

Year ending 25/12/25.	Year ending 24/1/27.
156	29

This diminution is attributed by the Police to the substitution of electric for cable cars.

To the foregoing disadvantages of the Cable System, the following should be added:--

1. Unlike an Electric system, the load on a Cable system cannot readily be increased beyond that for which the system was originally designed.
2. Single track working cannot be employed on a Cable system.
3. Once the route of a Cable system is determined, there are difficulties in altering the route by the interconnection of intersecting lines, as it is not always feasible for cars to turn from the one line into the other owing to the fact of the ropes not being central under the slots in the track, which in consequence gives a right and left hand setting of the grip in the Dummy, according to the change of direction.
4. The speed of the cable determines the maximum speed of the cars. Lost time cannot be made up as in an Electric system by speeding up the cars.
5. Except in cases of a serious interruption to the power supply from the generating power station (which under modern power house conditions is now extremely rare), delays due to power failure seldom exceed 20 minutes. The cutting or stranding of a rope on the Cable system causes a delay of hours.
6. Shunting at termini or intermediate points is much slower with cable than with Electric cars.
7. During heavy storms, the tunnels of parts of the Cable system become flooded. Such flooding throws an extra load on the power plant, and considerably decreases the speed of the rope.
8. The greater schedule speed of the Electric cars, as compared with Cable cars, reduces the platform costs per mile of the former as compared with the latter in the proportion in which the schedule speed of the one exceeds the schedule speed of the other.

For instance, if the schedule speed of a cable car is 9 miles per hour and an electric car 10 miles per hour, there will be a saving of 10% in platform costs in favor of the electric car.