

MELBOURNE AND METROPOLITAN TRAMWAYS BOARD.

NOTES OF EVIDENCE

TO BE GIVEN TO THE PARLIAMENTARY COMMITTEE OF ACCOUNTS

BY

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MELBOURNE AND METROPOLITAN TRAMWAYS BOARD.

13th September, 1927.

QUESTION: WHAT WOULD BE THE EXTRA COST TO THE PUBLIC IF MOTOR BUSES WERE SUBSTITUTED FOR THE EXISTING TRAMWAYS ?

1. The answer to this Question involves the following considerations:-

- (a) The number of buses and bus mileage which would be required to carry the present tram and bus passengers.
- (b) The amortization of the debt upon the existing tramways.
- (c) The additional annual expenditure which would require to be met by the Municipalities if the existing tramways were abolished.

2. The Board's Report for the year ended 30th June, 1927, shows that :-

The total passengers carried by the Board's cable and electric trams and buses during the year was .. .. 224,211,867.

The average cost of operating electric tramways, including Wages, Maintenance, and Power Cost, but EXCLUDING Interest on Capital, Sinking Fund, Depreciation, Rates, Payments to the State Government, and Bus Taxation, was .. 17.272 pence per car mile.

It is assumed that if the existing trams were replaced by motor buses, such buses would carry passengers at existing rates of tram fares and that the total revenue to be earned from the transport of the 224,211,867 passengers would be the same under either tram or bus operation.

3. OPERATING COST PER VEHICLE MILE.

The present cost of operating electric tramcars, viz., 17.272 pence per car mile, is used in the following calculations — although, as the conversion to electric traction of the cable tramways proceeds, such operating cost — owing to the adoption of "through routing" and other factors — is being gradually reduced.

The cost of operating the Board's buses for the year ended 30th June, 1926, was 18.589 pence, and for the year ended 30th June, 1927, 25.822 pence. The wages of bus drivers and conductors have considerably increased since the year ending 30th June, 1926.

The cost of operating for the year just closed cannot be used as a basis for estimating the cost of <sup>bus</sup> operation upon average routes. During the year ended 30th June, 1927, the Board's buses were used almost exclusively during conversion over very bad road surfaces, and — owing to conversion operations — were unable to maintain a reasonable schedule speed.

It is submitted that a low estimate of the cost of operating, on improved roads, a large fleet of buses, and operating under the most favorable conditions, would be at least 18 pence per bus mile.

4. RELATIVE AVERAGE SPEEDS.

The average schedule speed of the Board's electric tramways for the year ended 30th June, 1927, was 11.09 miles per hour.

The average schedule speed of the Board's buses during the same period was 9.91 miles per hour. As above stated, the average bus speed was reduced in consequence of unfavorable road conditions.

The Board's experience shows that a fleet of motor buses sufficiently large to cope with the whole of the passengers at present carried by tramcars could not ~~maintain~~ an average all-day speed equal to that attained by the Board's electric tramcars.

I have, however, assumed that both classes of vehicle could operate at the same average speed.

5. NUMBER OF TRAM AND BUS MILES REQUIRED TO CARRY 224,000,000 PASSENGERS PER ANNUM.

For the year ended 30th June, 1927, - 13,387,869 electric tram miles were required to carry 118,858,967 passengers. On this basis it would require 25,231,000 electric tram miles to carry 224,000,000 passengers.

For the same year, 1,029,796 bus miles were required to carry 5,374,484 passengers. On this basis, 42,920,000 bus miles would be required to carry 224,000,000 passengers. As, however, the existing number of bus routes and passengers is relatively small, deductions based upon these figures would not be a fair criterion of the results likely to be obtained were operations to be conducted on a much larger scale.

An estimate based upon the carrying capacity of trams and buses affords a better method of comparison. The average seating capacity of the Board's electric tramcars is 47 per car, and that of the Board's buses 25 per bus.

The number of vehicles required to cope with a given traffic is, however, determined by the number of passengers to be carried during the three or four hours of "peak loading." Upon such occasions in every large City in the world the seating and standing capacity of railway trains and tramcars is taxed beyond their limit. The rolling-stock and mileage run are therefore determined by the seating and standing capacity of the vehicles used.

Motor buses are not constructed to carry overloads, whilst railway carriages and tramcars are specially constructed to cope with "crush loading" conditions. The overload capacity of an electric car is very great as compared with its seating capacity. To heavily and continuously overload a bus accelerates depreciation and invites accidents to both passengers and vehicle. No "standing" passengers are permitted in buses operating in New York, and a maximum of about five "standees" is allowed during certain hours in London motor buses, which have an average seating capacity of 54.

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Investigation shows that the average carrying capacity of the Board's tramcars during "peak loading" hours is well over 90, while the average limit of "seating and standing capacity" of the Board's buses is less than 40. It is, however, uneconomical to permit buses similar to those operated by the Board to carry as many as 40 passengers, as such loads enormously increase the cost of maintenance and the rate of depreciation.

Adopting these figures, which are unduly favorable to motor bus operation, it follows that two and a quarter buses would be required to replace each existing electric tramcar.

Similar calculations made by transport authorities in Great Britain and America place the relative proportions at 2 and  $2\frac{1}{2}$  buses of an average capacity similar to the buses operated by the Board, to replace each electric tramcar. These proportions suggest that the number of bus miles which would be required to carry 224,000,000 passengers would be two and a quarter times the number of the electric car miles required to carry a similar number of passengers, or a total of 56,770,000 bus miles per annum.

On the other hand, it would not be necessary to operate two buses to replace each electric tramcar during the whole of the day, and it would be found that during a few hours each day buses on the basis of one to one could cope with all the loading offering. This would reduce the annual bus mileage. As, however, the crews must be paid a full week's wages each week for work confined within a certain spread of hours, the withdrawal of buses during slack hours would not permit of a large reduction in the number of men employed. The reduction of bus mileage would to a large extent be counterbalanced by an increase in the operating cost per bus mile.

My estimates show that, allowing for the possibility of adopting later and improved types of bus, it would be favorable to bus operation if we assume that the respective vehicle mileages required to carry 224,000,000 passengers per annum would be as under.-

By motor buses	..	45,000,000 bus miles per annum.
By electric tramcar	..	25,000,000 car miles per annum.

The shorter headway resulting from the employment of a greater number of buses compared with tramcars would attract some additional passengers in cases where the headway of the existing tramway services exceeds eight or ten minutes. The extra revenue which would be earned is, however, counterbalanced by the omission of other items which favor tramway operation.

#### 6. ANNUAL OPERATING COSTS - TRAMS AND BUSES.

Adopting the estimate of 18 pence per bus mile and the present cost of electric tramcar operation, viz. 17.272 pence per car mile, and assuming that 1500 buses (See par.7) could maintain an average schedule speed equal to that maintained by the existing electric tramcars, viz., 11.09 miles per hour, the operating costs would be as follows:-

By Motor bus	- 45,000,000 bus miles @ 18d	= £3,375,000
By Electric tram	25,000,000 car miles @ 17.272d	= <u>1,799,000</u>
	Extra cost of Motor-bus operation per annum:	<u>£1,576,000</u>

The relative "Capital Charges" are dealt with in subsequent paragraphs.

MEMO. Payments by the Board out of tramway fares to the State Consolidated Revenue (£108,000 per annum), Municipal rates upon tramway tracks (£13,000 per annum), and the value of free and concession fares (£30,000 per annum), have been omitted from all calculations.

#### 7. CAPITAL OUTLAY REQUIRED FOR TRAMS AND BUSES.

Accepting the proportion of two and a quarter buses to each electric tramcar, it is found that to transport 224,000,000 passengers per annum, about 700 electric tramcars or at least 1500 motor buses would be required for daily service - both of the same average capacity as the Board's existing electric trams and motor buses.

Additional cars or buses would be required as spares. Owing to the greater reliability of tramcars, the percentage of "spare" motor buses required would exceed the percentage of "spare" tramcars.

The capital outlay for tracks, buildings, plant, rolling-stock, and equipment of a type similar to the Board's existing electric tramway system ~~would~~ requiring 700 electric cars in daily operation, would not exceed £8,000,000. As applied to the Board's system, this figure

7. (Contd.)

includes a sum of about £5,000,000 already expended by the Board upon its electric tramway undertaking (See page 20 of the Board's Balance Sheet for the year ended 30th June, 1927).

In order to carry the same number of passengers by motor buses similar to those at present operated by the Board, 1500 motor buses in daily running, with buildings and equipment, would cost approximately £2,750,000. This figure can be compared with the Board's expenditure of £111,690 (Page 20 of Balance Sheet) to provide and equip 56 motor buses.

8. CAPITAL CHARGES PER ANNUM.

The capital expenditure <sup>charges</sup> upon the Board's electric tramway system may be estimated as follows:-

Interest  $5\frac{1}{2}\%$ , Sinking Fund 1%, Reserves (Depreciation, etc.)  $4\frac{1}{2}\%$ , - a total of 11% upon the whole of its outlay.

Upon a capital outlay on tramways of £8,000,000 @ 11% = £880,000 per annum.

The annual capital charges upon a bus undertaking costing £2,750,000 would be approximately as under.-

Buses and equipment, say, £2,500,000 @ $26\frac{1}{2}\%$ p.a.	=	£662,500
Buildings, land, etc., say, <u>250,000</u> @ 11% p.a.	=	<u>27,500</u>
		<u>£2,750,000</u>
		<u>£690,000.</u>

The allowance of  $26\frac{1}{2}\%$  in respect of buses is made up as follows:-

Interest  $5\frac{1}{2}\%$ , Sinking Fund 1%, and Depreciation and Reserves 20%, - which is a minimum allowance.

Saving in Capital expenditure charges by adopting motor buses in place of trams:- £190,000 per annum.

9. AMORTIZATION OF PRESENT DEBT ON TRAMWAYS.

At 30th June, 1927, the debt upon the existing cable and electric tramways (excluding buses) was approximately £4,500,000 (See page 20 of Report for year ended 30th June, 1927).

If the tramways be scrapped, the electric and cable cars, rails, buildings, land and plant, would realise at most £1,000,000.

This would leave a debt of £3,500,000 unrepresented by realizable assets, upon which an average of about  $5\frac{1}{2}\%$  interest per annum would require to be paid.

9. (Contd.)

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By establishing a Sinking Fund of 3% in order to extinguish the debt in about 20 years, the payments for Interest and Sinking Fund would reach £297,500 per annum.

10. COST OF ROADS SUITABLE FOR THE OPERATION OF 1500 MOTOR BUSES.

During the last few years, the principal bus roads in London (few of which were inferior to the best roads in Melbourne) have been entirely reconstructed in order to provide suitable motor-bus roads, although the average speed of buses in London does not exceed  $6\frac{1}{2}$  miles per hour.

The existing electric and cable tram routes <sup>in Melbourne</sup> /total 136 miles.

If the tramways were scrapped and the passengers were to be carried by motor buses, the whole of the unconverted cable tramway routes and electric tramway and bus routes which have not been laid upon concrete, together with the sides of such streets, would require reconstruction at an estimated cost of at least £4,000,000.

Assuming a rate of  $5\frac{1}{2}\%$  Interest and  $2\frac{1}{2}\%$  Sinking Fund, the annual expenditure (exclusive of maintenance) would be £320,000 per annum.

If we debit one-half of the annual charge which will be necessary in order to provide bus-proof roads, as the proportion attributable to motor-bus operation, a sum of £160,000 per annum is obtained.

The Board has constructed and maintains in first-class condition an average width of 17 feet at the centre of 136 miles of these routes. As long as the tramways exist, comparatively little reconstruction of these roads (other than for the reconstruction of the tramway tracks for tramway purposes only - from time to time carried out by the Board) will be required for some years.

11.

S U M M A R Y.

EXTRA ANNUAL COST TO THE COMMUNITY IF THE EXISTING TRAMWAYS WERE  
SCRAPPED AND THE PASSENGERS WERE CARRIED BY MOTOR BUSES.

	<u>per Annum.</u>
Additional cost of operation by Motor Bus (Par.6) .. ..	£1,576,000
Less saving upon "Capital" charges (Par.8) .. ..	<u>190,000</u>
	£1,386,000
Interest and Sinking Fund required to extinguish in about 20 years the nett debt of £3,500,000 upon the existing cable and electric tramway undertaking at 31st December, 1927 (Par. 9) .. .. .	297,500
One-half of the Interest and Sinking Fund upon Capital Expenditure for the provision of roads suitable for motor-bus operation (Par.10) .. .. .	160,000
The Board maintains the centre of 136 miles of road and lights 80 miles of route. This is included in the operating cost of 17.272 pence per car mile. No debit in respect of this expenditure is included in the bus operating costs. Minimum saving to the Municipalities .. .. .	<u>35,000</u>
	<u>Extra cost per annum £1,878,500</u>

12.

C O N C L U S I O N.

In order to raise additional revenue to the extent of £1,878,500 per annum the existing fares would require to be increased by 75%. It would, however, under existing circumstances, be impracticable to raise this additional sum from the present number of passengers by increasing fares, as such action would cause the transference of a large proportion of the passengers to the Railways and other means of transport.

If, on the other hand, the deficiency on a wholly motorbus transport system were raised by a Municipal Rate based upon the whole of the rateable property of the Metropolis, a rate of over two shillings in the pound would require to be levied.

An important consideration is that the power to operate electric tramways is produced locally, whilst the fuel necessary to propel motor buses must, under existing circumstances, be imported - either in a manufactured or semi-crude state.

Ignoring the question of the loss of employment to Australian industry—an interruption in the supply of petrol from



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overseas would compel motor buses to cease operation. No substitute for imported crude or refined spirit is at present obtainable, except in small quantities. The rapidly increasing world demand for motor spirit also foreshadows an increase in the price of motorbus fuel during the next few years.

The Board agrees with the conclusions of the most eminent authorities upon transport in Britain and America: that buses are not capable of meeting the demand for effectively transporting large masses of people during hours of "peak" loading at tramway-fare rates. At the same time it recognises that, given roads suitable for bus operation, light buses would prove valuable as feeders and auxiliaries to tramways and in the opening up of new districts which could not in the initial stages support a tramway service on account of the high charges per car mile for permanent-way, etc., in the earlier years.

In a large City like Melbourne there is room (under a properly coordinated system of transport) for trains, trams and motor buses without wasteful duplication and unnecessary competition. No one system of transport is sufficient for Melbourne's requirements. Investigation, however, shows that financial considerations preclude the displacement of the existing tramways by motor buses.

I have not dealt with the additional traffic congestion and numerous accidents to pedestrians which would obviously result from the substitution of 1500 mobile buses for 700 tramcars operating on rails.

Secretary.

10th September, 1927.