

MELBOURNE AND METROPOLITAN TRAMWAYS BOARD

MEMO. TO MEMBERS OF THE BOARD.

THE PRESIDENTS' CONFERENCE COMMITTEE TRAM

Nothing in all my tour impressed me more than the tram which has been evolved in the United States after three years of intensive investigation, research and experiment by the Presidents' Conference Committee working under the direction of the Transit Research Corporation and the American Transit Association, which in previous years was known as the American Electric Railway Association.

It may be interesting if I briefly set out the conditions which inspired the Transit Association to make a systematic and sustained effort in the field of transport. Six years ago the world was in the grip of the most severe financial depression ever known. In the United States the effects were felt all the more severely because of the prosperous heights reached in the years immediately prior to the awful collapse of values on the New York Exchange in October 1929. By 1932 the vast majority of the electric transport companies were in the hands of receivers; the rolling stock was antiquated and dilapidated, the overhead gear was urgently in need of renewal, and tracks required wholesale reconstruction. Looking to the huge amount of money invested in street car undertakings, it was recognised that something drastic must be attempted if the industry were to be saved.

As put to me by Mr. Charles Gordon, the Managing Director of the American Transit Association and General Secretary of the Transit Research Corporation, "We said, 'Is there anything that can be done to improve the street car?' We thought it was worth half a million dollars to find out. If the answer was 'No', we could then determine what our policy would be. Twenty-five of the Presidents of the leading street railway companies formed themselves into a Committee - promptly called the P.C.C. (Presidents' Conference Committee) - and they were given five years to investigate the

problem. At the end of three years the answer of the Committee to the question was so emphatically 'Yes' that it went beyond anything we had dreamed in the beginning. So the engineering staff went ahead, and eventually the result was what is now popularly known as the P.C.C. car."

The physical objectives of the technical experts were :-

1. High speed.
2. Modern appearance.
3. Low noise level, both inside and outside the car.
4. Good riding quality.
5. Good ventilation.
6. Good illumination.
7. Minimum wear and tear of track.

In addition, certain economic factors had to be kept in mind, as it was within these limits that success with the desired physical characteristics had to be achieved. These economic factors were :-

1. Low first cost.
2. Low operating cost.
3. Low maintenance cost.

All these objectives have, of course, been our own ever since we established our Workshops at Preston, and I am convinced that within the limits of our financial resources that we have been as successful as possible. We need only compare the few remaining trams of the Prahran and Malvern Tramways Trust and the Hawthorn Trust with the vehicles we are turning out to-day to appreciate the steady advance which has been made over the years. I have no doubt at all that had we been able to afford the necessary money that our engineers would ere this have solved the noise problem, for example, on much the same lines as those which have been found efficacious on the P.C.C. tram. Looking back on our many experiments with felt and rubber, it is extraordinary to observe how often we were just on the verge of success, and how often we stopped just short of achievement through lack of the necessary finance.

I am emphasizing this matter of finance in relation to experiment and research in order that it may be realised how much is possible when one's operations are untrammelled by monetary considerations. Nothing could illustrate my point better than the fact that the first P.C.C. tram cost no less than 75,000 dollars, that sum being, naturally, on top of the hundreds of thousands of dollars expended on research, examination and experiment.

It is almost impossible to report on this tram without trenching on the controversial subject of tram versus bus. If I introduce it at this stage it is only because I think it is essential to remember that this tram has been designed with the specific object of dealing with mass transportation in the very large cities. In an address delivered to the Canadian Transit Association in June last at Quebec, Mr. Gordon made this significant statement, which illustrates admirably the point I am making :-

"The field of the street car is to-day established in that range of traffic conditions that justify a vehicle of 60-passenger capacity with ability to absorb heavy peak fluctuations in traffic most economically. Applying the principles already stated, the traffic volume must be sufficiently dense to justify the operation of frequent base headways with vehicles of this size. Where these conditions are present, and when, in addition, limited street space and heavy rush-hour traffic volume demand the utmost in capacity and speed, with frequent stops, the modern street car continues to rank supreme among local transit vehicles."

When first placed in commission in 1936, the P.C.C. tram created a sensation because of its speed and comfort but chiefly through its silence. This is the great feature of the car, indeed, and the manner in which a very low noise level has been achieved had everybody very curious. Long before I went abroad we had, of course, considerable knowledge of this car, but the descriptive articles in the technical press had been severely censored, and it was not possible to learn from them or such specifications as were available to us just how the tram had been made so quiet. That was quite understandable; various patents had to be secured in order to protect the interests of those who had through their money made the

tram practicable. Even now I can refer to the expedients adopted for the suppression of noise only in general terms, for if you adopt the recommendation I shall make to you we shall have to take out certain patents here. You will be glad to learn, however, that Mr. Gordon showed me the greatest courtesy and consideration, and had no hesitation in informing me in detail of all the hitherto secret features of the tram. My meeting with him was a memorable experience, and provided me with memories which I shall remember always with delight.

As everybody knows, the greater part of the noise made by trams arises from the impact of a steel wheel on a steel rail. Doubtless in time some combination of metals and materials will be discovered which will banish much of that noise, but in the meantime we have to do the best we can both with the steel wheel and the steel rail. The rail has perforce to remain, and as the steel tire is a necessity also, the P.C.C. engineers commenced, as we did, to experiment with wheels and materials with the object of reducing, or suppressing, noise from that source. It would serve no useful purpose for me to describe the many experiments carried through with this object in view; suffice it to say that for two years wheels of all sorts from all countries were tested until eventually there was designed a wheel the steel tire of which is supported in rubber in such a way that noise generated at the contact with the rail is absorbed in that rubber to the maximum practicable extent.

Simultaneously, many other experiments were conducted in order to devise some means of breaking the continuous metal paths in the trucks through which sound is generated and transmitted. The solution here was found to consist of substituting rubber articulation for metal-to-metal contacts. The use of rubber in this way was carried to the extent of eliminating the steel car springs completely and substituting for them specially designed rubber springs. The various photographs I produce give a good general idea as to the extent this specially compressed rubber has

been employed.

So far as weight is concerned, the standard P.C.C. tram is 33,000 lbs. ($14\frac{3}{4}$ tons by British weight), but the double-end model such as in service in Chicago and which would be necessary in Melbourne weighs just on 16 tons unladen and is seated for 58 passengers as against 53 of the standard model. The overall length of this car is 50'5" (somewhat longer than our latest model), the width is 8'9", and the height from the rail to the top of the car is 10' $\frac{1}{8}$ ". In appearance it is moderately stream lined. It has a free running speed of 42 m.p.h., and the intention being to secure under ordinary service condition with eight stops per mile a scheduled speed of more than 14 m.p.h. Due to this much greater speed, it has been found possible to retire 156 old trams in favour of 83 of the P.C.C. model. The frame of the car body is of alloy steel, all welded into a single structural unit. Floor plates, side sheets, door and window frames, posts and carlines are all welded and become part of the structure. Other details of this tram are hydraulic shock absorbers which dampen vibration, a heating and ventilating air system by means of an air compressor and blower, three sets of brakes, including dynamic, magnetic and air, and leather upholstery.

When I reached New York in August last, the Brooklyn and Queens Transit Corporation had been operating these P.C.C. trams for 19 months and had just prepared a complete report on their working. The results obtained as to revenue, increased schedule speed, power consumption and accidents are shown in a series of tables and graphs. The 100 trams purchased were placed on the Smith-Coney Island, the McDonald-Vanderbilt, Seventh Avenue and Erie Basin routes. As the Seventh Avenue and Erie Basin lines operate for almost their entire length over other lines equipped with the older type of trams, and as in addition the routes have been altered to some extent since the new trams were assigned, comparative data is not available. The McDonald-Vanderbilt and

Smith-Coney Island lines, however, are substantially free from the older types of trams, and therefore an accurate comparison was possible between the results obtained by the P.C.C. trams and those which were recorded by the old vehicles. During the first year of operation, the Smith-Coney Island route revenue increased by 33 per cent, and the McDonald-Vanderbilt line by 24 per cent, while on the other parts of the Brooklyn-Queens system the revenues declined by 5 per cent. The new cars earned 5,725 dollars and 3,350 dollars more each on the two lines respectively than was earned by the trams operating those lines during the year prior to the introduction of the P.C.C. tram. The conclusion drawn from those figures by the Corporation is the "the P.C.C. cars tend to maintain the revenue level even during a general slump". During the remaining nine months covered by the report, the revenues continued to show that increase. Adjustments in running time resulted in increases of 14 and 13 per cent. It had been hoped to increase the speed by from 20 to 25 per cent, but the heavier patronage made that impossible. As the result of the greater speed and capacity of the trams, however, platform costs were reduced by several thousand dollars the first year, the cost per mile falling from 6 to 9 per cent on those two lines. On a mileage basis, the accidents decreased 24 and 16 per cent respectively, while on the basis of passengers carried the decreases were 23 and 27 per cent respectively. All types of accidents, except those coming under the heading of "Persons Struck", decreased. The "Persons Struck" increase was officially attributed "to the quiet, fast movement of the car, which is deceptive to pedestrians who occasionally endeavour to cross the streets between intersections". So impressed was the Toronto Transportation Commission with the extremely favourable reports from all operators using the P.C.C. trams that it was decided in June last to modernise the Toronto tramway system by ordering 140 P.C.C. trams, the largest

single order so far placed. The Canadian Car and Foundry Company of Montreal, who hold the manufacturing rights for Canada under licence from the St. Louis Car Company, is busy on this order. I visited the works in August last and inspected the cars in course of construction, one being ready for delivery. I asked the Vice-President (Mr. A. D. Neale) to furnish me with an approximate price. Mr. Neale has since written me saying that his Company could build one car complete for approximately 23,000 dollars, f.o.b. Montreal. That figure is, Mr. Neale explains, exclusive of any royalties to the Transit Research Corporation, and is based upon the Company building the tram along with another order which may be received from some Canadian Tramways Company.

I had a long discussion with Mr. Gordon as to the terms upon which we could secure the manufacturing rights in the P.C.C. tram for the Board for Australia. Mr. Gordon read over the form of license prepared for Italy, and indicated that the Australian license would be similar, modified only to suit the different conditions in Australia. I have now received copies of the suggested agreement between the Transit Research Corporation and ourselves. It proposed that we should pay 5,000 dollars to the Corporation upon the execution of the agreement, we in return receiving the exclusive license, with right to sub-license, to manufacture within the Commonwealth all cars and trucks embodying all present and future inventions of the Corporation. We should have to take out patents in Australia similar to those which cover the cars and trucks in the United States, and make available to the Corporation any improvements which we make upon the designs ourselves. The Corporation will furnish us with plans, data and drawings, and will extend its technical co-operation for the purpose of enabling us to make up detailed drawings. In addition to that initial payment of 5,000 dollars, there will be a royalty of 5 per cent on the net selling price of all cars and trucks and parts

manufactured and sold by the Board or its sub-licensees. Where, however, the cars, trucks or parts are for the sole use of the Board or its sub-licensees, the royalty will be 5 per cent on the value placed upon such cars, trucks and parts in the stock records, plus 10 per cent. The eleventh article of the agreement provides that if, after four years, the royalties have amounted to less than 20,000 dollars, the agreement can be cancelled by either the Corporation or ourselves giving 90 days written notice. If changing conditions after this period of four years make the conditions of the agreement inequitable, adjustments can be made, it being provided, however, that in no case shall the royalty go higher than 8 per cent or lower than 3 per cent.

It would be easy, as you will realise, to compile for you an overwhelming mass of material on this P.C.C. tram. In this report I have dealt ^{shortly} only with the main features, and I think that you will agree that they are impressive. The main proof of the pudding is in the eating, and the fact that 800 of these trams are now running to the great satisfaction of the operators and that 600 more have been ordered within recent months is proof conclusive to my mind that the cars are fulfilling the most optimistic hopes entertained for them. There is no possible doubt now that wherever they have been introduced they have attracted people back to the tram, that they have increased revenue, lowered costs, and given the public an immeasurably higher standard in silence and riding comfort.

I therefore recommend that the Board enter into the agreement with the Corporation, and that an order be placed for one car. I make that proposal because it seems to me the easiest and most practical way of demonstrating its value to the Board and to the public, and because our technical staff will then be able to adapt certain of the features to our present rolling stock while

at the same time having always before them the example of the complete car.

H. H. BELL,

CHAIRMAN.

13th October, 1938.