

Wickham

For my talk this evening I propose to give you some inside information regarding tramcars. Many listeners in, apart from being the real proprietors of the tramway undertaking, ride in the cars daily and may be interested to know more about them. That part of a tramway system which (after the fares, of course,) most interests the travelling public, is the cars, and any tramway system is to a great extent judged by the type and degree of maintenance of the rolling stock.

As regards the cable trams, these came into use over 40 years ago and they are a credit to the men who designed and built them. Most of the dummies and cars that were used at the opening of the service are still running, and there is no doubt that they will see the service out. There could be no better testimonial for those who built these cars than to say that after 40 years they are practically as good as when built. How many miles have these old stagers covered, and how much money have they earned? Fortunately, the old Company left a very complete history of every car that was put on the road, and we, of course, keep careful records, so I am able to tell you that Car No. 1, which is now running on the Richmond line, first saw the streets of Melbourne on November 11th, 1885. Since that date it has covered well over a million miles and, like Johnnie Walker, is still going strong. Even when we are finished with these old trailers they still have uses. With the

conversion of the Cable System to Electric we have been able to withdraw 120 trailers. These have been sold to the general public at £15 each, and judging by the demand for them they have been found useful. It is hard to say offhand what they are used for; all we know is to whom they have been sold. However, we have heard that some of them are now sleep-outs, wireless cabins, ferries, workshops, and bathing boxes. The dummies are not in such demand as the trailers, but we get £5 each for them. I think the majority of them will end their days as shelters in public reserves. I should like to take this opportunity to advise buyers that it is desirable to give their cars at least two coats of good lead paint and to keep them painted, as experience shows that cars standing always in the open deteriorate more quickly than those in service. It weighs 17 tons ready for the road. Now we come to the electric cars. Unfortunately, we have a great variety of these in service. This is due to the fact that when the Board took over the five electric systems round Melbourne, it became heir to all the cars belonging to the various Trusts. These cars were designed by different Engineers to suit local conditions. They have, as far as possible, been brought to the Board's standard conditions, such alterations being mostly mechanical and therefore not apparent to travellers, two noticeable features, however, are the standard colours and the destination sign.

With the conversion in sight we set about designing a car that would be most suitable for service on all lines. After much thought and experiment we decided on the low-centre-entrance bogie car. We now have 180 of these cars in operation. When

we were designing them the governing conditions were :-

Climate

Average distance travelled per passenger

Density and type of traffic

Freedom of ingress and egress

Speed

Weight and

Strength

The complete set of drawings for the new car numbered the cars can make 30 miles an hour on the level. They are driven 110. There is nothing which is not shown in detail. Let me give you a rough idea of the outstanding features of the new car. It is nearly 50 feet long and 7' 6" wide. It weighs 17 tons ready won't bother you with any technical details of the mechanism; you for the road, and it has seating accommodation for 52 people. I can almost hear someone ask rather feelingly - "What is the standing accommodation?". Well, it is designed to carry 150 seated and implies, controls the movement of the car. standing without encroaching on the footboards. Of course that is As for the Brakes - I once read that ever since George the number it will hold, but it is strong enough to carry twice the Stephenson invented the locomotive, engineers have been studying weight of 150 people.

It is found by experience in Melbourne that cars must be to a great extent closed in. Open cars have been tried and found achieved some success, as modern braking systems are very efficient. most unpopular.

stopping it. The first is by means of an airbrake. That is the

The absence of end doors on these cars has been commented regular method and it gives a nice, comfortable stop or a quick pull-up.

on: there are three reasons for their omission - as necessity demands. If anything goes wrong with the airbrake, there

1st. The seating would be reduced very considerably. is a hand brake. If something should happen that puts these two out

2nd. It is very difficult for the conductor to watch of action, or if passengers getting in or out when signalling

the driver to start. emergency brake. This is operated from the controller and causes the

3rd. The steps at the ends would necessarily be high. motors to exert a force in a direction opposite to that in which the

Now as to speed. All sorts of speed have been credited car is travelling. We don't often have occasion to use this form of to our new cars. People in a hurry have compared them to snails, brake.

while others who have tried to head them off at a stopping place claim that they go up to 50 miles an hour. Well, in future you

can will be able to tell anybody who wants to know the truth that

the cars can make 30 miles an hour on the level. They are driven

by four 40 horse power motors. For those of you who understand

electricity I might add that we use 600 volts direct current. I

won't bother you with any technical details of the mechanism; you

have all seen the motorman operating the controller with his left

hand and the air brake with his right. The Controller, as its name

implies, controls the movement of the car. The Board took control

As for the brakes - I once read that ever since George

Stephenson invented the locomotive, engineers have been studying

how to stop it. Well, when you see how modern cars can be brought

up you must admit that the engineers who followed Stephenson have

achieved some success, as modern braking systems are very efficient.

Although we have only one way of driving a car we have three ways of
problems in this system owing to the linking up of so many suburbs.

stopping it. The first is by means of an airbrake. That is the regular method and it gives a nice, comfortable stop or a quick pull-up, as necessity demands. If anything goes wrong with the airbrake, there is a hand brake. If something should happen that puts these two out of action, or if we want to stop very suddenly we have the electric emergency brake. This is operated from the controller and causes the motors to exert a force in a direction opposite to that in which the car is travelling. We don't often have occasion to use this form of brake.

One of the principal objects aimed at in designing the car was to get the steps as low as possible. In this case they are first 12", second 12 $\frac{7}{8}$ ". These figures are the same as those for the cable cars and are as low as permissible. I might mention that at a tramway conference in America this year it was resolved to try and keep steps no higher than 16" and 16 $\frac{1}{2}$ ", so it will be seen our steps are very easy by comparison with American standards. It is not generally realised by travellers what an amount of mechanism is below the floor, this, of course, has an important bearing on step height.

One of the first things we did when the Board took control was to standardise the destination signs on the front and rear of the cars. You have no doubt seen the conductors turning the signs to reach a particular one, and perhaps have wondered how many names there are on the roll. Existing signs now have 60 names. These are carried on a strip of calico 45 feet long. The destination sign is becoming quite a problem on this system owing to the linking up of so many suburbs.

While this is being assembled and the flooring laid the
My description is incomplete without mention of the life-
guard; this is automatic in action. You will notice at each end
of the car a gate hanging from the floor, and consisting of 2 or 3
slats; a few feet behind this is the guard proper, consisting of a
cradle made up of wooden slats on an iron frame, the front end of
which is some inches from the ground. When a body or obstruction
strikes the gate the guard is automatically dropped and slides along
the rail, picking up the object lying on the track.

Having given you a rough idea of the new bogie car as it
stands ready for service, I would like to tell you something of where
and how we build it, and what we put into it.

We are establishing an up-to-date workshops at Preston,
which is now the birthplace of all the cars the Board builds, and
where two new cars are turned out every three weeks. We have 17
acres there, and when the first section of buildings to cater for
600 cars is erected it will cover $4\frac{1}{2}$ acres of floor space, the ultimate
area being about 7 acres. This will look after 1200 cars. Within
a few months we expect to have the first section finished and then
all the work connected with the building and maintenance of the Board's
trams will be done there.

The first part of the car body to be put together is the
underframe. This is built of steel, the sections chosen being those
rolled in Australia.

While this is being assembled and the flooring laid the carbuilders at the benches having received the pillars, rails, etc., from the wood machinists, clean up and assemble those parts so that they are always available to fit together on the underframe, all parts being made to templates go together readily. When all these parts are in position the steel sheeting is fixed and the roof boards put on, 5000 screws being required to hold the roof boards down. This may seem extravagant, but the roof is subject to great vibration and racking and must be made to remain watertight. The canvas is then laid down on whitelead while the latter is soft; 3 cwt. whitelead per car is required. At this stage the electric staff come in and run their wires and fix the apparatus under the floor. While the foregoing was being done the trucks have been made, so the carbody is now lowered on to these. The car builders fit and fix the fittings and the electrical staff complete their work and test the car exhaustively, after which it is handed over to the painters.

Ten coats of paint and varnish are applied outside and three coats of varnish inside, the seats being given 4 coats of very hard varnish. The monogram and numbers are then transferred on; the time taken in the Paint Shop is from 19 to 21 days, according to weather conditions. The cost of painting a new car, exclusive of overhead and standing charges, is £116.

The policy of the Tramways Board is to use Australian material as far as possible. The trucks, wheels, and axles are locally made; the timbers are Australian with the exception of the floor and roof,

and the 3-ply seats in the saloons. We have been unable to obtain suitable light weight timbers for the first two, and local manufacturers have been unable to satisfy our requirements for 3-ply. Australian timber experts will notice figured Queensland maple in the door panels. Victorian Mountain Ash is used for sashes, door and bulkhead framings, while the all-important pillars are of Tasmanian Blackwood, which timber is also used for the curved roof ribs. It may not be generally known that this curvature is obtained by steam heating the wood, then bending it in a press. Blackwood lends itself most satisfactorily to this treatment. We always carry 3 years' supply of timber to insure our using only seasoned material.

All the varnish now used is Australian.

When it comes to the electrical equipment we are forced to go overseas for the bulk of what we require, although assistance is being given to local manufacturers and a few equipments made in Australia are being tried out. Others have been ordered and will be tested in service as soon as they are delivered.

We are quite proud of our new car and comment from citizens and experts from abroad has been highly favourable. The cost ready for the road is £3250. It is recognised by the Board that Melbourne citizens are justly proud of their city and it behoves the Board to put out a good car and to maintain it so that it will be an ornament as well as a necessity.

Now as regards the maintenance of the cars, each of the 400 electric cars now in service is attached to one of the 9 depots located in the suburbs. Every car has its regular day in its depot once a week, when a thorough inspection and adjustment of all working parts is made and the car is washed down and cleaned outside and inside. Every night the brakes are examined and adjusted, and electrical and mechanical parts looked over, also the carbody is disinfected, swept and dusted and the windows cleaned. I might mention that each bogie car has 44 windows to be cleaned.

Although there seems a large number of cars in the depots at mid-day, a visit to any of them at say 5.30 p.m. will disclose a practically empty shed, all available cars being in service. Some cars are only on the road during peak hours, others are out all day and may run any distance up to 200 miles in one day. Men are available at all times in every depot in case of trouble and are very satisfactory. It might be of interest to some developing on a car, while at the electric Depot at South Melbourne we have an emergency motor vehicle equipped to deal with any accident - this is always in readiness with a trained crew. To provide further for any trouble which may cause interruption in repairs after collisions constitute quite an important part of our work and one that we cannot regulate or keep all running times.

Another branch of the Car maintenance which may interest you is that carried on at the Workshops. After 100,000 miles of running, that is, about every 3 years, every car is taken to the Workshops for general overhaul, when the body is repaired if necessary and revarnished, the mechanical and electrical parts being taken to pieces and brought up to first class condition. Between these general overhauls, that is, after 50,000 miles, every car is taken to the Workshops and varnished. The seats of all open parts of cars are varnished every 6 months as you will realise the wear on these is very heavy.

Another reason for cars visiting the Workshops is for attention to tyres. These require turning about every 40,000 miles and renewing after 60,000 to 80,000 miles. Before the War all tyres were imported, but they are now obtained locally and are very satisfactory. It might be of interest to some to know that the tyre is heated until it expands, when it is dropped over the wheel and cooled, thereby causing the tyre to shrink. This shrinkage is the only means of holding it on.

Repairs after collisions constitute quite an important section of our work and one that we cannot regulate or keep to a system. During the year 1925 we had collisions equivalent to $5\frac{1}{2}$ per 100,000 miles. In view of prophecies made by some people that we would have many more collisions when we came into

Swanston Street you will be interested, and the prophets disappointed, to know that for the 5 months our electric trams have travelled that street the total number of collisions for all electric systems has shown a decrease of $7\frac{1}{2}\%$ on the figures for the previous year. It is also interesting to know that of our collisions $\frac{2}{3}$ are with motor vehicles and $\frac{1}{3}$ with other vehicles.

Of course the damage from collision is not always great but it generally necessitates the renewal of the steel side panels and of the 10 coats of paint previously referred to. The heart of the car painter requires to be of the reinforced kind as it so often happens that a newly painted car is the victim of a collision.

Then there is the parent who allows his or her child to stand on the seat, forgetting that there are nails in the shoes; also the person whom Koko in the opera "Mikado" might add to his little list - He who, finding a newly painted car dusty, writes on it with his finger, causing the dust to cut into the varnish, making marks which can only be removed by taking the car to the Workshop.

We have at present under construction 10 Safety cars. These have been taken on quite extensively in America and we have had two in use for some time on the Power Street/Hawthorn Bridge route.

As their name indicates they are designed for safety. The car cannot be started until the steps are up and the doors closed and vice-versa, also should the motorman lose control from illness or other cause, power is cut off and the brake automatically applied. These will be distinguishable by their colour being green and cream similar to the painting of the Board's buses.

With a desire to find if improvement can be made on the existing standard, a car is in service having in the centre portion longitudinal seats as on the dummies of cable cars. These seats are fixed. Another car of similar type is under construction but this will have the longitudinal seat backs to throw over so that passengers can sit on the inside in bad weather.

I have tried to avoid technicalities and hope that my rather rough description of our aims and methods may have been of interest to listeners in, and that it will help tram travellers to appreciate that it is our desire to make their travelling as safe and comfortable as possible. **GOODNIGHT!**