The exhaust steam from the engines was used in a simple and effective way to heat the water supplied to the boilers and so economise fuel as much as possible without the aid of a condenser which latter appliance was inadmissible as the engine houses were almost always placed on or near the highest ground passed over by the line and consequently far from a river or any other cheap water supply.

At first smoke from the engine houses was a nuisance but afterwards it greatly diminished.

The cables passed from the engine house to the roadway along tunnels which were illuminated (firstly by gas and later electricity). Before passing to the road tunnels, they were guided around large sheaves, and it was possible to watch the operation of releasing and gripping of cables by the gripmen on the trams on the roadway above.

It was, of course, quite possible to see "daylight" through the slot opening in the roadway and from time to time objects would fall into the pit below - these were mainly coins.

On the walls of the tunnels strong clamps were affixed to hold the cables firmly when any splicing or adjustment had to be made (to a section of the cable) when in the engine house. This was done in order to prevent the cable slipping off the many wheels in the tunnels along the road. Also in the pit beneath the roadway, oil cans were in position to drip oil on to the cable thus keeping it flexible. At a point of entry, the cable passed through a U shaped fork and should any foreign matter be caught-up or a strand broken on that section, upon striking the fork, an alarm would sound in the engine house calling the attention of the engineers who were able to immediately detect the fault and clear same before the section returned to the road. Such action could have necessitated the stopping of ALL cables propelled by the engine house.

As a guide to the position of the splice in the cable, an indicator board, propelled by the driving shaft, turned in a circle and an arrow pointed to the position.

To further assist engineers to inspect the cables as they passed through the engine house, small seats were attached to the high trestles (which carried the ropes to the tension pulleys) to enable staff to sit alongside the (moving) cable and watch for defects. So expert did the engineers become in their work, they could detect the slightest imperfection. (This operation is recorded on cine film.)

In several engine houses electric motors were used to assist propulsion. At the North Carlton engine house where only one cable was propelled, electric power only was used after 18 October, 1919.

/The engines

The engines ran smoothly and almost silently. A feature was the greasing and oiling every thirty minutes. This was usually carried out by apprentices.

The weight of the tightening pulley was five tons.

When heavy rain caused water to pour into the pits at the engine houses, it was pumped out speedily by big pumps - drainage was very important.

Engines at the Richmond power house (the first to operate) were driven by large cog wheels when first operated. However, protests from many nearby residents re the noise caused a change and it was not long before manilla ropes ropes replaced the cog mechanism.

The interior appearance of the engine houses (often referred to as winding houses) was one of pride. They were kept in spotless condition with polished brasswork and glistening paintwork. In some instances, ferns were used as a decoration.

Every possible assistance to engineers was employed and in addition to the splice position indicator and alarm bells, a counter also operated to record the number of turns of the driving shaft. This would assist in giving the position of certain sections of the cable if need be.

The Esplanade, North Carlton and Northcote engine houses propelled only one cable.

At the South/Port Melbourne engine house, two cables ran in the city tunnels as far as Clarendon Street where the South Melbourne cable was diverted to the suburban line.

Following the Armistice of the Great War, all engine houses were stopped for two minutes at 11.00a.m. on 11 November. (This continued until about 1936.)

The North Melbourne engine house, propelling one cable only, continued to operate for a short time following the closure of the North/West Melbourne lines. This cable was propelling the line in Elizabeth Street for Brunswick cars still operating.

Chairman's Report 20 January, 1905.

> "ENGINE HOUSES - The principal change has been the substitution of 14 foot for 12 foot drivers, to enable a greater speed to be maintained on the suburban sections of the tramways. This has been effected at the following places: St Kilda; Johnston Street; South Melbourne; Toorak; Richmond; Rathdown Street; Brunswick. At the first four of these the helical gearing has been removed in addition. At the Esplanade Engine House the elaborate friction gearing, originally fixed, was not found to work satisfactorily, and was replaced by rope gearing, and some minor alterations carried out."

/ INFORMATION

Information Obtained from Victorian Historical Society

Brunswick Street Engine House, Fitzroy

This site was purchased by the Company before formation of Trust. Its dimensions were 115 ft to Victoria Parade x 165 ft to Brunswick Street. The price paid was £7,534.7.6. It was purchased in May, 1885 by Trust from company in accordance with terms of Act.

It was not until the Engine House was nearly completed that it was found necessary to get more ground, the principal reason being that a large water supply was necessary to prevent failure in case the supply gave out, which as the Engine House was in high ground might occur in times of scarcity. In June, 1886 the necessity was reported and a plot with 34 ft 9 inches to Victoria Parade and 129 ft deep was purchased at a cost of £2,095/5 including the buildings thereon so that the whole site has cost say £9,630 for a block 150 ft x 165 ft.

Chapel Street and Toorak Road site

The Trust purchased from the Company in August, 1885 a block at this corner 100 ft to Toorak Road by 180 ft to Chapel Street for £2,441. This was considered sufficient at the time, but since then it has been decided to take the tramway by Domain Road, and a rearrangement of cables will be necessary so that three takeups will be required instead of two. An extra piece is required consequently but the price is under reference. We require 30 ft extra frontage to Chapel Street by 110 ft depth; 210 ft to Toorak Road by 180 ft depth.

Gertrude Street and Nicholson Street

We bought in May, 1886 a block at the corner, 115ft 5in to Nicholson Street by 198ft 5ins to Gertrude Street with a block at the back 39ft x 43ft from W. Roff for £13,226. Owing to the necessity for large water supply tanks here, we require a small piece extra 59 ft x 30 ft and were paying £295 for it.

These are the only cases where we have had to purchase extra pieces and the two last are the only two cases where we have had to buy back land we did not purchase originally from the company when we could have done so.

/FROM

FROM INFORMATION SUPPLIED BY M.M.T.B. ..... AS OF 1916

SCHEDULE OF FREEHOLD AND LEASEHOLD PROPERTY

Power Houses (11)

1.	Fitzroy	Victoria Parade and Brunswick Street, Fitzroy, with W.B. Cottage
2.	Richmond	Bridge Road and Hoddle Street, Richmond
3.	Nicholson Street	Gertrude and Nicholson Streets, Fitzroy
4.	Carlton	Johnston Street, Fitzroy
5.	North Carlton	Rathdown and Park Streets, North Carlton
6.	Brunswick	Brunswick Road, Brunswick
7.	North Melbourne	Queensberry and Abbotsford Streets, North Melbourne
8.	South Melbourne	City Road, South Melbourne
9.	St Kilda Road	St Kilda Road and Bromby Street, Melbourne
10.	Prahran	Toorak Road and Chapel Street, South Yarra
11.	Windsor	Wellington Street, Windsor
12	Northcote	High Street, Northcote (1920)

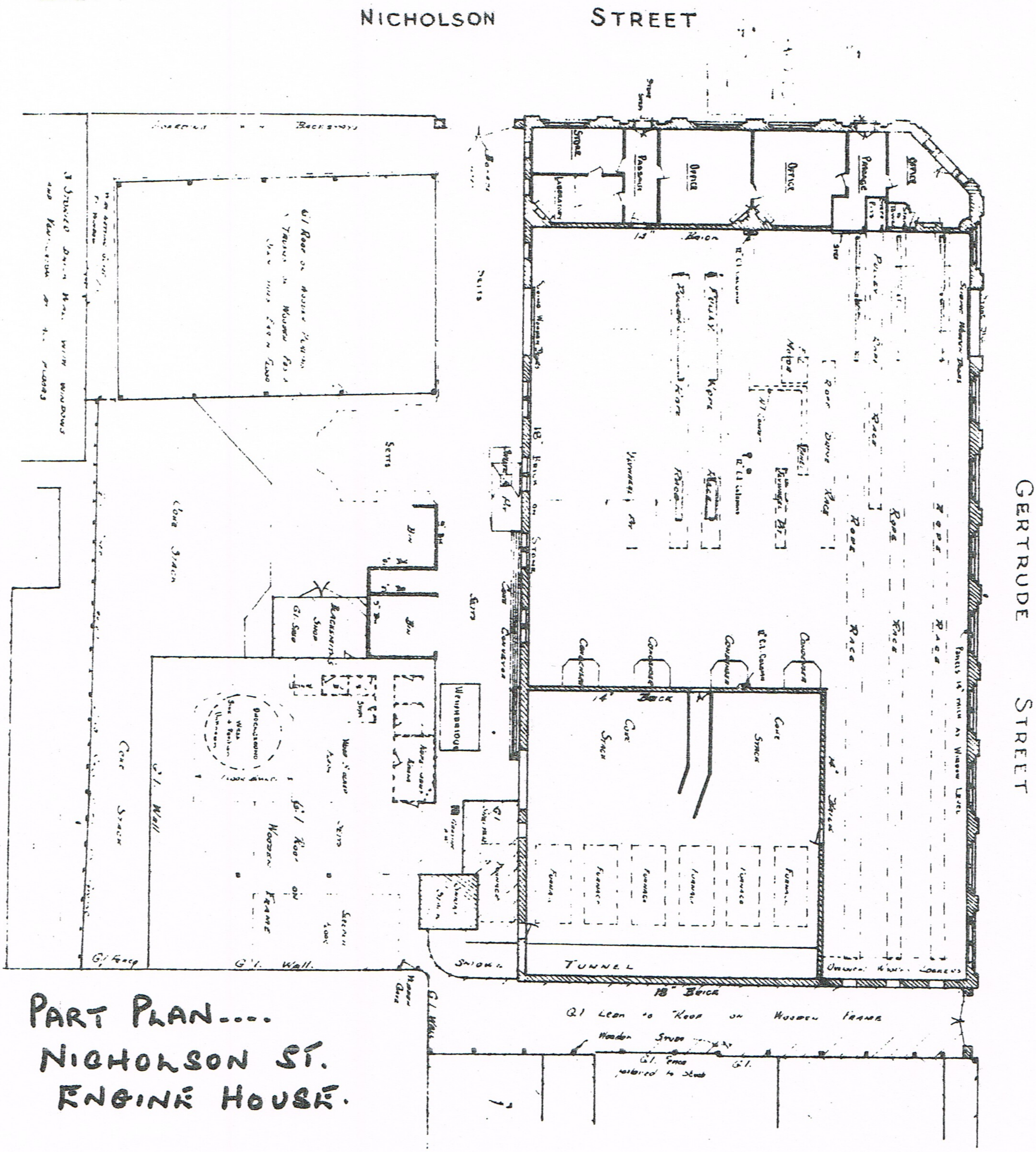
Car Houses (16)

13.	Victoria Street	Victoria Street, Richmond
14.	Carlton	Johnston Street, Collingwood
15.	Clifton Hill	Plenty Road, North Fitzroy
16.	North Fitzroy	St George's Road and Holden Street, North Fitzroy
17.	Nicholson Street	Nicholson Street, North Fitzroy
18.	North Carlton	Rathdown Street, Carlton (part Leasehold)
19.	Brunswick	Sydney Road, Brunswick
20.	North Melbourne	Flemington Road, North Melbourne
21.	Port Melbourne	Beach Street, Port Melbourne
22.	South Melbourne	Victoria Avenue and Beaconsfield Parade, South Melbourne
23.	Esplanade, St Kilda	Acland Street, St Kilda

/24. Brighton

24.	Brighton Road, St Kilda	Brighton Road, St Kilda
25.	Prahran	Chapel Street, Balaclava, with W.B. Cottage
26.	Toorak	Chapel Street, South Yarra
27.	Richmond	Bridge Road, Richmond (Leasehold)
28.	Royal Park	Royal Park (Leasehold)
29.	Head Office	Bourke Street, Melbourne
30.	Tramway Repair Shops, Factory, and Brick Cottage	Nicholson Street, North Fitzroy
31.	Store Yard	Arnold Street, South Yarra
32.	Store Yard and Feed Works	Victoria Street, Fitzroy
33.	Two Brick Shops adjoining Power House	Bridge Road, Richmond
34.	Store Yard, adjoining Power House	Victoria Parade, Fitzroy
35.	Store Yard adjoining Power House	70 Cecil Street, South Melbourne
36.	Tar Distilling Works	Flinders Street Extension (Leasehold)

The above properties are Freehold except where otherwise described.



PART PLAN....
NICHOLSON ST.
ENGINE HOUSE.

PERMANENT WAY

The tracks along the roadways were well constructed and trams "glided like swans" almost silently along the streets. The occasional clang of the bell as the gripman called for right-of-way was really the only indication of a tram on the road. Road traffic was generally light and the tram services very frequent; passengers rarely having to wait more than a few minutes for transport.

A great deal of material went into the construction of cable tracks but when completed, the capacity was tremendous. The excavations for the tunnels were 3' 9" deep. The overall width of double track was seventeen feet. Briefly, the other main dimensions were:

Gauge - 4' 8½"

Distance between slot centres - 9'

Distance between inside rails - 4' 3½"

The tunnel was formed of cement and reinforced with yokes, which were pieces of old railway line bent into almost the form of an "O" but with a narrow opening left at the top.

Tracks were laid in three grades:

"A" for heavy traffic. Rails were 87 lbs to the yard; slot beams were 65 lbs and the yokes were set at 3' centres.

"B" - 74 lb rails; slot beams were 52 lbs and the yokes were set at 3' centres.

"C" the lightest standard and used on the suburban ends - 67 lb rails; slot beams were 52 lbs and the yokes were set at 4' centres.

The axles for the 9" pulleys, upon which the rope ran, were borne by brackets bolted to yokes at approximately 2' 6" below road level. Generally, the pulleys were at 33' intervals. For greasing and maintenance there was a manhole at each pully covered by a cast iron grating. The rope did not run directly under the slot opening of 7/8ths inch but 1¾" to one side; the side on which the grip jaws opened.

The bottom of the grip was 22 & 5/8ths inch below the road level with a tolerance of 5/8ths inch up or down. Generally, grip jaws opened on the north or the west side. Of course there would be places like Toorak Road and Lonsdale Street where the opening would be to the south.

/Extract from

Extract from information supplied by MMTB. .. from records of MTO co 1916

"PERMANENT WAY

The rails are steel and of the grooved girder type of various sections according to the density of the traffic. The weight ranges from 57 to 87 lbs per yard and the depth from 5 inches to 6½ inches. A small proportion are of the 57 lb section (St Kilda Esplanade), the majority being of 67 lb section with 87 lbs in the streets carrying the heaviest general traffic.

The rails are jointed with fish-plates and bedded upon concrete 6 inches thick, the gauge of the tracks being 4 feet 8½ inches throughout, and the space between the tracks about 4 feet. The whole of this width and for 18 inches beyond the outer rails is paved with wood blocks varying from 5 inches to 6 inches in depth and dressed with tar and sand. The total width of track (17 feet) is maintained by the Board.

The Cable runs in concrete tunnels beneath each track, 3 feet 8½ inches deep, in which are embedded wrought iron "U" shaped frames (yokes). Longitudinal iron girders, known as slot beams, are bolted to the top of the yokes, forming a continuous opening ⅞ inch wide, through which the dummy grips pass to connect with the cables. The cable is supported in the tunnels by small vertical pulleys spaced 33 feet apart. At curves and termini the cables are conducted by larger horizontal pulleys and sheaves. The routes and power houses are provided with telephone and electrical alarm equipment which allow the traffic staff to promptly signal instructions to stop the cable in case of accident, and also automatically indicate when a stranded or otherwise injured cable reaches the power house."

Above each vertical pulley (9" diameter) a manhole covered by a cast iron lid allowed maintenance crews (two) to grease and adjust the pulleys. The crews carried their oil cans and grease from wheel to wheel and they also carried a small red disc with the word DANGER printed in white letters. This was attached to an iron spike about three feet in length and was spiked into the wooden blocks (which formed the roadway in between the rails). The manhole cover was removed and one man went below to grease the mechanism. When a tram neared the second member indicated its approach by tapping the rim of the manhole and the man below usually remained and 'held-back' to allow the grip to pass. The crew worked their way slowly along the track greasing each pulley and then usually travelled back to the engine house standing on the rear of a trailer.

/Along the

Along the track various marks were inserted - marble strips about four inches wide (these were illuminated from above at night to asist gripmen.) ..... One strip was for STOP, three for "throw rope" and two for "pick-up". Although these marks were always in position and kept very clean in order that they could be easily identified, gripmen knew the tracks so well they propelled their trams effortlessly hardly noticing the marks.

At various points, two iron doors on hinges (about four feet long by six inches) formed part of the slot. These were used in an emergency should a grip have to be removed from a dummy. The dummy was pushed into position over the doors and hauled out of its cradle by block and tackle or by hand (both gripman and conductor lifting).

Track maintenance

Approximately two cars to each route were fitted with scrapers. This equipment was used in early mornings to remove some of the grit and dust from the rail grooves. Shopkeepers protested at the dust raised and that is why the operation was always carried out before the shops opened for business. There was a further dust nuisance when the annual tarring of the wooden blocks took place. The blocks formed the road surface between the rails and for eighteen inches each side. Heaps of sand were deposited alongside the track from horse drawn drays and a gang of men armed with shovels and brooms would appear on the scene together with a tar cart with its little wood fire burning underneath. Men would spread the tar with huge watering cans whilst others would cover the tar with sand, followed by men sweeping it evenly with large brooms. Finally, one workman would run a scraper bar along the track to remove most of the sand which had found its way into the grooves.

Other gangs were often seen at work picking out the blocks in order to adjust ties and repair rails where faults and depressions had occurred. Where the track had been well worn, the rails often weakened at the joints. New sections of rail were put in to replace worn out parts. The men would then file the joints to ensure a smooth surface. Corrugations which formed on the rail surface were attacked with large files held in a clamp. The men would sit on a cushion of bags while they pushed the files back and fore.

Generally, the cable tracks were very solid. The large quantity of concrete set around steel yokes kept the whole of the tracks in a firm block. Rails did wear into bumps and the flat sections of track in Bridge Road, Richmond and Victoria Street, Abbotsford became very bumpy before the lines were closed.

Where the lines diverted, the points were altered by raising a lever which moved both rails and the centre slot to the new position. The lever remained in position without having to be held. It was the conductor's duty to alter the points and they became quite skilled as they lifted the lever, signalled the gripman forward and jumped aboard the trailer kicking the lever back into position "on the run". At various points (usually near the engine house or at a branch line turn-off) the cable was placed into the grip per

/medium of a "drum"

medium of a "drum" which lifted the rope into the grip. The drum was actually a large wheel revolving on a lever to which a wire rope was attached. This was pulled upwards and the rope eased into the open jaws of the grip.

Every possible use of gravitation was made and on some lines the trams ran without propulsion for quite some distance. When a fairly steep hill had to be negotiated, the conductor was required to operate the hand brake on the trailer in order to assist the gripmen control the tram. The inclines in Bourke Street between Queen and Elizabeth Streets, and in Collins Street between Russell and Swanston Streets, were two sectors which required this operation.

/SCHEDULE OF

SCHEDULE OF ROUTES AND MILEAGES - 1916

ROUTE	CITY TERMINUS	SUBURBAN TERMINUS	MILES
St Kilda (Brighton Road)	Madeline and Queensberry Streets, Carlton	Brunning Street and Brighton Road, St Kilda	5.01
Toorak	Madeline and Queensberry Streets, Carlton	Irving and Toorak Roads, Toorak	4.95
Prahran and South Yarra	Lonsdale and Swanston Streets	Chapel and Carlisle Streets, St Kilda	4.80
St Kilda (Esplanade)	Lonsdale and Swanston Streets	Barkly and Acland Streets, St Kilda	4.40
Brunswick and Royal Park	Flinders Street Railway Station	Sydney and Moreland Roads, Brunswick	4.45
Collingwood and Clifton Hill	Spencer Street Railway Station	Northcote Bridge (Queen's Parade)	3.79
North Fitzroy	Spencer Street Railway Station	St George's Road and Barkly Street, North Fitzroy	3.69
Victoria Street	Spencer Street Railway Station	Victoria Bridge, Abbotsford	3.61
Richmond	Spencer Street Railway Station	Hawthorn Bridge, Richmond	3.60
South Melbourne	Gisborne Street, Melbourne	Victoria Avenue and Beaconsfield Parade, South Melbourne	3.60
Port Melbourne	Gisborne Street, Melbourne	Beach Street, Port Melbourne	3.53
Carlton and Abbotsford	City Road (Princes Bridge)	Johnston Street,Bridge, Abbotsford	3.34
Nicholson Street	Spencer Street Railway Station	Nicholson and Park Streets, North Fitzroy	3.34
North Melbourne	Flinders Street Railway Station	Flemington and Boundary Roads, North Melbourne	2.92

/North Carlton

ROUTE	CITY TERMINUS	SUBURBAN TERMINUS	MILES
North Carlton	City Road (Princes Bridge)	Rathdown and Park Streets, North Carlton	2.84
West Melbourne	Flinders Street Railway Station	Queensberry and Abbotsford Streets, North Melbourne	2.05
Windsor	Chapel Street, Windsor	Barkly and Acland Streets, St Kilda	1.95
			61.87

CABLES

As no Australian company manufactured cables, they were imported from England and shipped to Melbourne at the bottom of cargo ships. Unloading was a slow and steady procedure. The original method of unloading by hand-over-hand made for laborious work but in later years the method was to draw the cable over the side of the ship per medium of passing over a wheel (about one foot diameter) driven by an electric motor and passing the entire length slowly on to a series of two drays linked together where it was very carefully coiled. (A movie picture of this operation is shown in the 16mm film held by MMTB). As cables were about five miles long, several sets of lorries had to be used. Each set was drawn by four draught horses who plodded slowly through the streets (usually at night) hauling the load to the engine house. Here the cable would be unloaded and wound on to a large drum situated at the rear of the tension pulleys. The weight of the cable was approximately nine tons for eleven thousand feet.

The cable (invariably called the 'rope') was the key to propulsion. Being hidden in the roadway, only those concerned with its operation really understood its working. It consisted of six strands each of seven steel wires surrounding a hempen cord. The circumference was 3¾/4" and breaking stress over forty tons. Oil was dripped on to the cable (at the engine house) to keep it flexible.

New cables were first used on heavily trafficed lines such as St Kilda Road, Collins Street and Bourke Street and later transferred to lighter trafficed lines. Final use was often on the West Melbourne and North Carlton branch lines where only a few cars operated.

When the cables were first threaded into the road tunnels, the end was attached to a grip in the dummy and a team of horses used to slowly draw it along the line. As the distance became longer (ie the length of cable being drawn out from the engine house), the weight naturally increased and it was necessary to use more and more horses. Great care had to be exercised to ensure no injury was sustained to the rope.

As a system of signalling 'STOP AND GO' along the line men were stationed at various intervals with a short pole bearing a red flag at one end and a white one at the other. Upon signal - all white - the cable was moved forward and upon signal - all red - movement was stopped.

(My father witnessed the installation of the Victoria Bridge line and actually saw the signalling in operation). Once the cable was threaded any subsequent one was drawn through the road by the one to be withdrawn thus actually threading took place only once.

The splicing of the cable was a highly skilled job and it was almost impossible to detect the position in the rope. When a new cable was installed, gripmen had to exercise great care in the first few days of operation as the rope was not fully flexible until it was 'broken-in'. The splice was usually about fifty feet long.

/The cable

The cable ran continuously through the grip except when the gripman 'threw the rope' in order to either change cables or go around a curve.

It was possible to see the cable operating beneath Prince's Bridge and grips could be detected as tram passed overhead. On an occasion about 1937 when the Bourke/Elizabeth Streets crossing was being strengthened, the entire road section was open and the cable in Bourke Street was clearly visible. I actually filmed the movement of trams from below street level and this is recorded on the film held by the MMTB.

The ropes on St Kilda Road and Collins Street were the most frequently changed as they carried the greatest volume of traffic. The cable in Collins Street was extra heavy and consisted of six strands laid around a hemp core, each strand comprised seven fine wires around which were laid eight wires of about the thickness of a two inch nail. The circumference was 4¼" and the cable ran for about seventeen weeks before being transferred to another line with lighter traffic.

Stretching - cables stretched 100' on the first day of operation, then approximately twenty feet the following week before settling down. It was necessary to resplice the cable when the stretching was beyond the capacity of the tension race to contain it.

There was always a slight 'hum' in the cable tunnel when it (cable) was running and if no car was in sight it was possible to 'sense' if the rope was actually operating. (It was most unusual for a car not to be in sight as the service was so frequent). When the cable ceased to operate for some reason people became conscious of the fact and often commented.

Most passengers accepted that the cars ran silently along the tracks and were hauled by the endless unseen rope. No attention was really paid to the actual mode of propulsion at various points. Gripmen opened and closed their grips as the tram journeyed on but after 'throwing the rope' they did not necessarily pick-up the same cable. In some instances they coasted for both short and long distances for every possible use of gravitation was availed upon.

In order to indicate to gripmen just where to stop, throw the rope or pick-up various markings were inserted in the roadway. One strip of white marble, about four inches in width, indicated a stop mark; three strips indicated 'throw the rope' (outside the Northcote engine house a red lamp attached to a pole bore the words ('THROW ROPE') and two white strips indicated pick-up. At some points three strips across the track and then three short strips indicated that gripmen throw the rope and then close the grip without a cable.

/When cable

When cable operations ceased in Bourke Street (the last line to operate) the cables remained in the road for about twelve months in case it became necessary to run the trams again. With the Second World War at its peak, a possible shortage of fuel could have made this necessary, but it was not to be. The cables were run for about ten minutes each day to keep them in order.

When cable lines crossed, one cable had to be above the other. This was effected as follows:

At St Kilda Junction, the St Kilda cable was ABOVE the Windsor rope on the down track and below on the up.

Flinders St over Market St (Richmond Line)	Johnston St under Smith St (Clifton Hill line)
Gertrude St under Brunswick St (North Fitzroy line)	Johnston St under Brunswick St (North Fitzroy line)
Elizabeth St over Collins St (Brunswick, North and West Melbourne lines)	Elizabeth St over Bourke St (Northcote and Nicholson St lines)

Originally, the Elizabeth Street cable powered from Brunswick between Victoria Markets and Flinders Street ran BELOW those of Bourke and Collins Streets. Later this section was propelled from North Melbourne and date of change is believed to be 3rd March, 1890, coinciding with the opening of the North Melbourne line.

Between 12th June, 1904 and 13th August, 1905, the cable was again powered by Brunswick but reverted to North Melbourne on 14th August, 1905. In the meantime, the Elizabeth Street cable was made the upper cable at Bourke and Collins Streets - date of change unknown. Possibly the introduction of longer and heavier cars on the Brunswick route made the change desirable, and at about that time the official operating the depression pulley in Bourke Street disappeared as thereafter the Bourke Street rope would be permanently depressed.

Nicholson Street over Johnston Street. The Nicholson Street line crossed the Collingwood line at this point.

The Swanston Street cable was UNDER Flinders, Collins and Bourke Streets and, as gripmen had to throw at each crossing, was one of the reasons for the great strain on the St Kilda Road rope engine house which propelled this section.

Until approximately 1936, cables were always stopped at 11.00a.m. on 11th November to observe the two minutes' silence of the Armistice which followed the First World War. The position of the splice was always known to engine house staff.

A heavier cable used in Collins Street for sixteen weeks was transferred to the Fitzroy line and ran for five years.

Many cables, after their lifespan had been fulfilled, were used as fencing around sports ovals in Melbourne. Many are still in existence to-day (1972).

Extracts from General Manager's Reports - 19 August, 1892

"Alterations to Curves. - The wear and tear of ropes on some of the sharper curves has proved very great, and a device was introduced by Mr Duncan, Engineer in Charge, before he left for England, for reducing the friction by substituting one large wheel at the points of junction of the tangents of the curves for the small pulleys previously used. This has been found most effective, and will be probably adopted at all curves where the gradients admit of the cars travelling round by their own momentum. The lead of the ropes also into some of the engine houses is being simplified by the Company with the same object. It is intended to ask the sanction of Parliament to defray the cost of these very necessary alterations from the Trust's loan moneys.

Cables - The following table shows the dimensions, weight, &c., of the cables used on these lines:

Maker	Line	Length In feet	Circumference In inches	Weight T	cwt	grs	lb
Craddock	North Melbourne (city end)	10,889	3 3/8	9	5	0	0
"	" " (Flemington Rd end)	12,919	3 3/8	11	3	0	0
"	West Melbourne Branch	17,422	3 3/8	14	17	0	0
"	Port Melbourne (city end)	10,815	3 3/8	9	5	1	2
"	" " (Beach St end)	16,794	3 3/8	14	8	0	25
"	South Melbourne	22,626	3 3/8	19	2	0	0
Smith	St Kilda Esplanade	20,940	3 3/8	23	17	0	0

As all the above lines were originally intended for horse operation, it is likely that they were provided with a lighter cable in order to save expense.

When the original cables were replaced, these were the lines, with perhaps the exception of South Melbourne and City end, that used the second hand cables.

Extracts from General Manager's Reports - 20 January, 1904

"Curves. - At the places enumerated below, 12 foot sheaves were substituted for the small curve pulleys. This alteration effects considerable saving in the wear of the cables, and has now been carried out wherever the levels make it practicable:- At the corner of Spencer and Flinders Streets (down track), Flinders and Spring Streets; Clarendon and Park Streets; Montagu and Park Streets; Montagu and Bridport Streets; Hanna Street (both tracks). At the corner of Bay and Beach Streets the curve was in addition shortened from 137 ft to 81 ft, and the radius from 90 ft to 55 ft. At the junction of the St Kilda Esplanade and Brighton Road lines an auxiliary cable was originally placed to enable traffic to be shunted from one line to another. This arrangement has been found unnecessary and the auxiliary has been dispensed with, as has also a somewhat similar one at the corner of Collins Street and Market Street. In the Carlton line the terminal of the City section of the cable has been removed to the corner of Russell and Lonsdale Streets, and an auxiliary cable now runs between Russell and Swanston Streets, taking the trams round the curve, and thus relieving the main cable from wear."

Extracts from General Manager's Reports - 30 June, 1918

"Wire Ropes. - The importance of maintaining a supply of wire ropes has always been recognised by the Board, large orders being cabled in May, 1916. All supplies require the approval of the Munitions Departments in Melbourne and England, and licences must be obtained for both manufacture and shipment. The British Government has given our orders next preference to the needs of the Army and Navy, which rightly come first, and the Board desires to gratefully acknowledge its generous treatment. Owing to the war there has been great delay in the execution of orders: Some of the ropes which were ordered 18 months ago are not yet to hand and others have been lost at sea en route to Australia.

Under these circumstances it is necessary to keep the ropes in use as long as possible; this has led to frequent interruptions to traffic and it is feared the Board may yet be compelled to discontinue some of the services.

Wire Ropes. - During the earlier portion of the year, the supply of wire ropes caused the Board great anxiety, and it was only by the exercise of the utmost care that it was possible to maintain the various service without serious interruption. Of late the supply of new ropes has been steadily improving, and I think the position is now quite safe."

/Extracts

Extracts from General Manager's Reports - 30 June, 1918

"Proposed new Customs tariff. - The proposed new Customs tariff will greatly increase the Board's expenditure both as regards maintenance of existing and the construction of new tramways. By way of example, two items may be mentioned viz. the proposed duty upon cable tramway ropes and upon tramway rails.

Cable tramway ropes are not manufactured in Australia and practically the whole of the Board's supplies are obtained from Great Britain. Ropes of the special manufacture required for the cable tramways are not used in connection with other industries and are at present imported duty free. From 1 January, 1921, however, a duty of 30% is proposed upon ropes imported from England. The proposed duty upon tramway rails will also very seriously add to the cost of the new electric tramways.

In consequence of the difficulty of obtaining new ropes on account of war demands, the lives of those in use have been extended by devoting the utmost care and attention to their maintenance and the consumption of ropes has consequently been reduced to a minimum. If ropes on order are received in any reasonable time, the service will be maintained."

LENGTHS OF CABLE (IN FEET)

Richmond	Flinders Street, City	24,870
Richmond	Bridge Road, Suburban	14,704
Fitzroy	Collins Street	16,920
Fitzroy	Victoria Street	22,380
Fitzroy	Brunswick Street	22,680
Nicholson Street	Nicholson Street	19,080
Nicholson Street	Bourke Street	17,600
Nicholson Street	Smith Street	23,880

Brunswick	Victoria Market	22,560
Brunswick	Moreland Road	16,695
Johnston Street	Russell Street	19,000
Johnston Street	Johnston Street Bridge	15,000
St Kilda Road	Swanston Street, City	23,140
St Kilda Road	Brighton Road	30,240
Toorak	Toorak Road	15,270
	Domain Road	17,640
	Chapel Street	22,110
Rathdown Street	-	13,617
North Melbourne	Elizabeth Street	19,940
	Flemington Road	12,919
	West Melbourne	17,422
South Melbourne	Clarendon Street	22,626
	Collins Street	10,815
	Port Melbourne	16,794
Esplanade	-	20,940
Northcote	-	25,000

AUXILIARY CABLES

Auxiliary cables were of short length and used to propel trains (usually) around corners so as to save wear and tear on the main cables. A total of five were used on the system but two were withdrawn fairly early at:

St Kilda Junction to propel trains from St Kilda Road into Fitzroy Street. (This was replaced by the working arrangement of the Esplanade cable as described in The Esplanade Line);

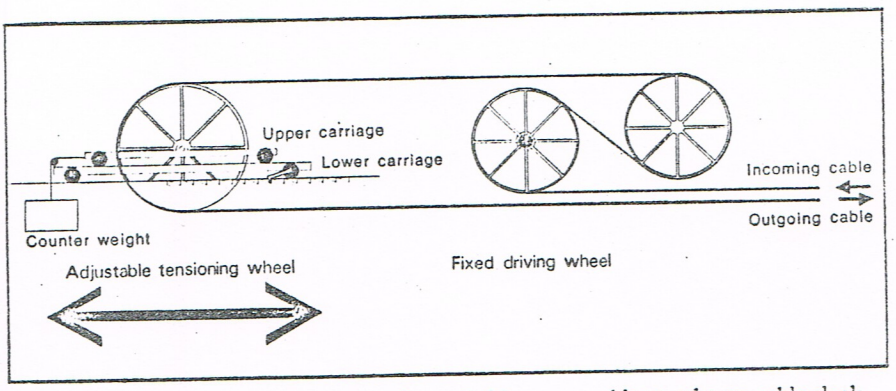
the corner of Market and Collins Street ... the auxiliary was worked off the South Melbourne turnback sheave. This was withdrawn and cars worked by momentum to enter Collins Street;

the turn opposite the Metropolitan Fire Station at Eastern Hill propelling North Fitzroy and Victoria Bridge trains from this point to the engine house. The grip struck a bell in the tunnel to remind gripmen to 'throw'. This cable was propelled by the engine house on the corner - Victoria Parade/Brunswick Street;

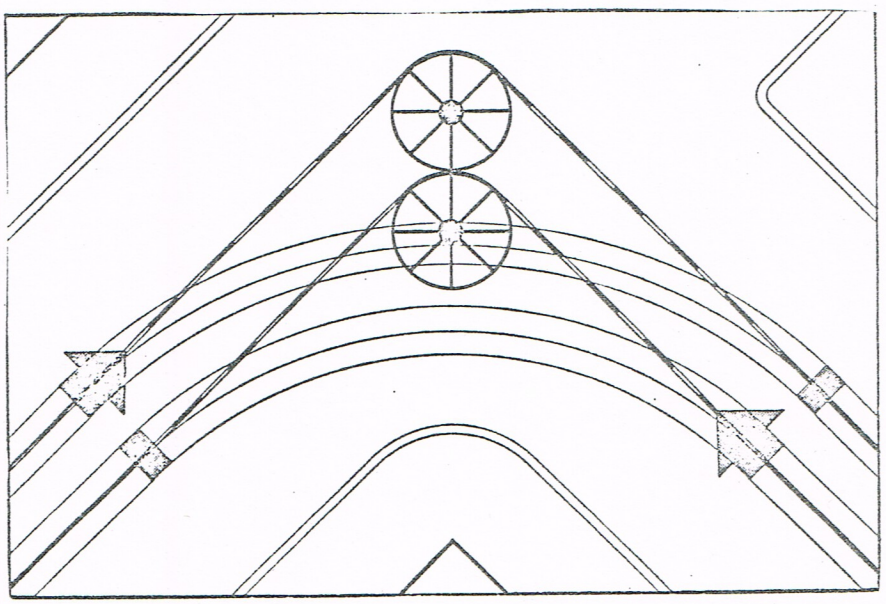
the turn from Nicholson Street into Gertrude Street for Clifton Hill and Northcote trains - in both directions. This cable was propelled by the engine house on the corner; and

Lonsdale Street - between Russell and Swanston Street. DOWN traffic collected the auxiliary in Swanston Street before turning into Lonsdale Street and were hauled into Russell Street where the rope was thrown and the Carlton propelled rope collected automatically. This rope was driven off the turnback sheave on the Russell/ Lonsdale Streets corner. UP traffic moved by gravity.

The speed of auxiliary cables was always much slower than that of the main cables - about 8 mph.



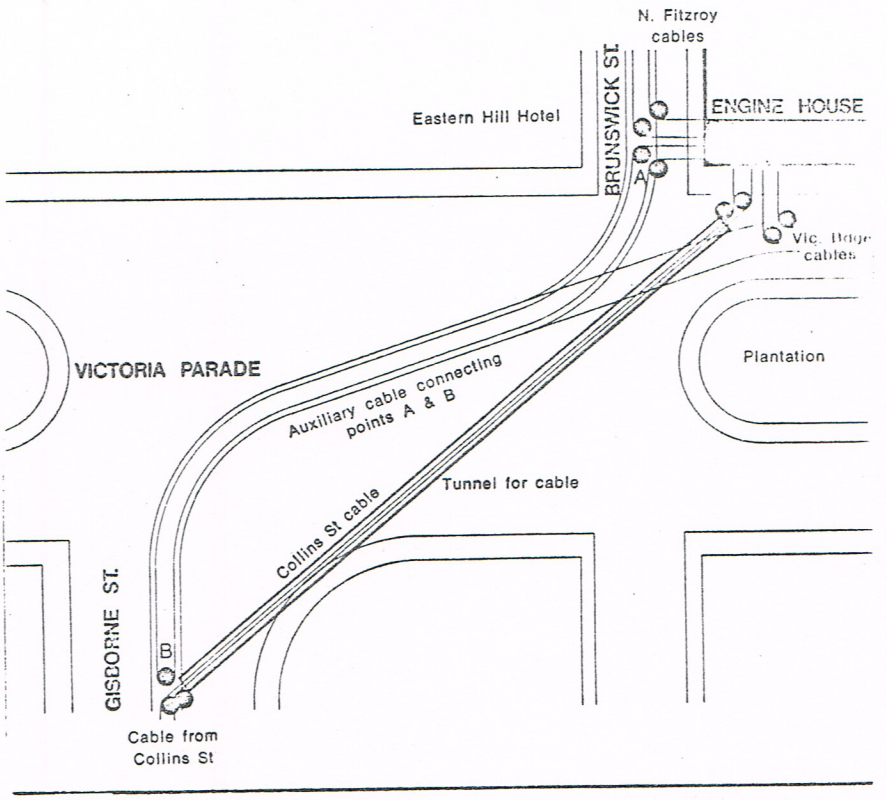
Tension gear: upper and lower carriages (left) are movable to take up cable slack



Typical 'right-angle' curve: the cables are diverted around two single sheaves to avoid wear which would be caused by a series of smaller pulleys

Acknowledgement .....

These drawings from John Keating's book MIND THE CURVE.



Victoria Parade Junction: the Collins St cable by-passes the curve which is served by an auxiliary cable

This operation referred to in the section .. Victoria Bge. and North Fitzroy routes .. Collins Street section. A bell sounded in the cable tunnel when struck by the grip just near the point marked 'cable from Collins Street'.

22 JAN 1918

OVERWORKED TRAM CABLES.

BOARD'S DIFFICULTIES.

"NURSING" THE OLD ROPES.

There is increasing difficulty in obtaining a supply of new wire ropes from Great Britain for the Melbourne cable tramway system, due in part to the high pressure at which all British steel works are working on the manufacture of munitions, and in part to the limited shipping space that is available. As a consequence, the Tramway Board is using the ropes far beyond their normal life limit, and though the staff of "rope men" are spending much extra time in looking after them, the ropes are showing the inevitable symptoms of old age, the most common of these being the breaking of the surface wires. When these are severed they stand up like the "quills upon the fretful porcupine," and to prevent increased damage—for instance, the wrenching out of whole strands that might ravel up the rope over a length of 1,000ft. or more—all broken wires must be clipped off at once. Stoppages from this cause are much more frequent than they were in pre-war times, are annoying no doubt, but in the circumstances it is only what might be expected.

According to the service so the life of the rope varies. On an easy route, such as that to West Melbourne, it may survive four years; but in the Collins street section, with the steep gradient between Swanston and Russell streets, and the sharp curve into Spring street, it ages so rapidly that in three months youth has gone for ever, and in another three months it would have reached extreme old age. But as an ageing man is put, if possible, to light work, so an ageing rope is put to light service on one of the less busy and less severe routes. By doing this the tramway experts have found that the work that can be got out of a rope is very considerably increased. It is strange, though, that no rope expert can say with any degree of assurance what the life of a new rope will be. Of two ropes which may both undergo the preliminary tests equally well, one will reach its allotted span, and the other's constitution, perhaps, will break up while it is still in its prime. After a rope has been in use for some time, however, the expert can tell pretty accurately what is its "expectation of life." Yet if you ask him how he tells this he cannot explain how he does it. There are signs of wear and tear, which any tyro, of course, can detect, but how far these have shortened the life of the rope only an expert can say, and in his diagnosis he depends for the most part on the promptings of a finely-trained instinct rather than on demonstrable facts. There are men now in the service of the board who have been training this instinct for 20 years and more. No rope of feeble constitution, no matter how robust it may look outwardly, can deceive these rope doctors, and that the diagnosis is something of a feat will be understood when the size of the patient is taken into consideration, for some of the ropes are 25,000ft. long.

It is satisfactory to know that even if the supply of new ropes were cut off tomorrow, the full tram service could be maintained for several months, and a gradually decreasing service for a much longer time. For the shortage of ropes did not take the board unawares. Before the board took over the cable tramway system it foresaw the increasing difficulties that would be met with in obtaining supplies, and therefore doubled its orders. This provision has placed the board in a comparatively comfortable position, for it has, as already said, sufficient ropes to last for some time, and then new ropes are coming to hand from time to time. The new supply may be intermittent and scanty, but, nevertheless it is a great help. In this matter it should be said that the Imperial authorities have been exceedingly liberal; they have, indeed, strained a point to do Melbourne a favour, for while we are still allowed to get new ropes there are cable tram systems in Great Britain where the supply has been cut off absolutely, and in one instance, unless peace be soon declared, and the wire rope making industry be unshackled in consequence, the trams will soon cease to run.

28 NOV 1922

TRAMWAY CABLES.

How "Stranding" is Caused.

A second serious dislocation of tramway traffic within a few weeks, as a result of "stranded" cables, has raised the question whether there is any inherent defect in the quality of the cables. Mr. H. S. Dix, chief manager of the Tramways Board, stated yesterday that although there was no connection between the dislocation of services on the Wellington street and Fitzroy street (St. Kilda) lines on Sunday night and the mishap on the St. Kilda road line three weeks ago, the cause in each instance was a "strand" in the cable, due to a "kink." These "kinks" were caused practically every day, and generally by the omission of a gripman to throw his grip out of gear, so that he fouled the cable against the check-bar in the conduit. But in 75 per cent. of these cases the "kink" could be repaired, as the rope-watchers at the power-houses paid special attention to them while the cable was passing over the wheels. The spot was marked, and, if the defect was pronounced, the cable was stopped and strengthened, or perhaps left until after midnight and a steel core inserted.

On Sunday night the "kink" was so severe, said Mr. Dix, that two of the seven strands in the cable parted, and the cable "bunched" for 3,000ft. in the channel. The result was a huge, tangled mass of steel wire, which threw a great strain on the cable and broke it. It was not until half past 6 yesterday morning that the two ends were cleared and spliced.

Mr. Dix states that there is nothing to find fault with in the quality of the cables. Shortly after the war the general quality of cables deteriorated slightly, but as good material as ever was in the ropes now.

RUN-INS and RUN-OUTS CABLE DEPOTS. TUESDAY 30-1-34.

BRUNSWICK.	33	trains	OUT	from	5.29	am	to 8.34	am
	13	"	IN	"	8.52	am	" 9.58	am
	4	"	OUT	"	1.47	pm	" 2.32	pm
	17	"	OUT	"	4.4	pm	" 5.1	pm
	25	"	IN	"	5.41	pm	" 6.47	pm
	2	"	OUT	"	7.22	pm	" 7.34	pm
	3	"	IN	"	8.13	pm	" 8.37	pm
	15	"	IN	"	11.12	pm	" 12.7	pm
CARLTON.	16	trains	OUT	from	5.34	am	to 7.21	am
	6	"	IN	"	8.51	am	" 9.30	am
	8	"	OUT	"	4.0	pm	" 5.0	pm
	10	"	IN	"	5.55	pm	" 7.2	pm
	2	"	OUT	"	7.10	pm	" 7.30	pm
	1	"	IN	"	8.16	pm		
	9	"	IN	"	11.20	pm	" 12.13	am
CLIFTON HILL.	39	trains	OUT	from	5.38	am	to 8.0	am
	12	"	IN	"	8.22	am	" 10.29	am
	5	"	OUT	"	1.32	pm	" 2.29	pm
	13	"	OUT	"	3.13	pm	" 5.21	pm
	21	"	IN	"	5.48	pm	" 7.0	pm
	1	"	OUT	"	7.24	pm		
	10	"	IN	"	7.57	pm	" 8.52	pm
	20	"	IN	"	11.12	pm	" 12.27	pm
NICH. ST.	17	trains	OUT	from	5.41	am	to 8.8	am
	6	"	IN	"	9.9	am	" 10.36	am
	2	"	OUT	"	12.34	pm	" 1.4	pm
	1	"	IN	"	1.55	pm		
	5	"	OUT	"	2.32	pm	" 3.30	pm
	6	"	OUT	"	4.0	pm	" 4.48	pm
	11	"	IN	"	5.37	pm	" 6.36	pm
	1	"	OUT	"	7.21	pm		
	2	"	OUT	"	7.52	pm	" 8.19	pm
	1	"	OUT	"	10.0	pm		
	12	"	IN	"	11.10	pm	" 11.54	pm
NTH CARTN.	3	Trains	OUT	from	6.0	am	to 7.0	am
	3	"	IN	"	10.40	pm	" 11.30	pm

trains IN from 7.52 pm to 8.15 pm
" Out " 10.37 pm
" IN " 11.20 pm to 12.34 pm

Chart showing movements of trains from various depots. These records made available by Ian MacMeiken - MMTB engineer.

COLLECTION OF FARES

The Bell Punch

The collection of fares was effected from the first running of the trams by means of a bell punch. This system continued until gradually replaced by a check ticket system during 1922/23.

The bell punch can best be described as under (Quote Australasian October 1901) ....

> "An ingenious device resembling in principle the ticket punch of a railway porter. It is carried by the conductor who wears pinned to his coat a 'trip-slip'. He punches this once for every fare received; the action is simultaneously registered on a dial inside the punch and a bell rings to appraise the passenger of the fact. The punch is provided with a patent lock, the secret of which is known only at headquarters and an effective system of check is thus secured."

Until the cessation of the bell punch system, the only tickets held by passengers were check tickets issued to passengers paying a through fare and transfer tickets. The latter enabled passenger to transfer to another line where the cable system crossed without the necessity of having to pay another fare. When lines were electrified, the transfer system was greatly reduced and eventually was withdrawn and in general sections were reduced and there was a slight increase in fares.

The trip slips worn by conductors measured 7" x 1½" and were of various colours for each denomination:

One penny	green	(always)
One penny half penny (half fare)	red	Towards the end of the system, MMTB used mauve tickets.
Two pence	white	Used by Tramways Board 1916/19, then by MMTB until system abandoned.
Threepence	white	Used by Company to 1916.
(full fare)	orange	Used by Tramways Board.
Twopeence half penny	cream	Used by MMTB.
Threepence half penny	grey	used by MMTB.

/(It

(It is recalled that the latter two may have been used on Swanston Street lines (only) and shortly before the system was abandoned.) I recall the grey (3½d) ticket being used on the Prahran line on a Sunday only.

Provision was made for fifteen holes on either side and in the centre of the ticket a space provided for line, date, conductor's badge number, car number and time of starting to be inserted. A space was also provided for the name of a student conductor.

The bell punch was held by a strap worn over the shoulder and fell away to the right hip and was readily available to the conductor's right hand. The punch would not work until a ticket of thin cardboard (the trip-slip) was inserted into its jaws. It recorded the number of times it was used by two hands which moved around a clock face inside the punch.

The round clippings from the tickets were also collected in a small container attached as part of the punch and were counted against the cash takings.

Passengers paying a through fare were issued with a check ticket which bore a heavy black number printed in its top right hand corner. The number corresponded with the badge number of the conductor. Colours of the check tickets varied with the different routes, e.g. Clifton Hill was yellow; others were white, pink or blue. After passing the end of the first section, the conductor would again go through the car and around the dummy and collect all the check tickets. Failure to produce same meant payment of another fare. (A familiar term of the day was 'end of the penny section'. This was occasioned by conductors calling same as they were about to check through the tram as above.)

Transfer tickets were available on most lines. The transfer was requested at the time of paying the fare. This (transfer) ticket was of thin paper and the conductor would punch out the time and direction which were printed around the edge of the ticket with a small clip-out type of punch. The date was printed in the body of the ticket so a new batch was required each day. From the Clifton Hill terminus, upon payment of a 3d fare a transfer to either Abbotsford or Carlton at Johnson Street was allowed. If travelling towards Carlton, upon request without payment of a further fare, another transfer to North Carlton could be issued and the same thing happened in reverse. Passengers on the Toorak line could transfer to the Prahran line (and vice versa) by changing at the engine house at the corner of Chapel Street and Toorak Road.

/Passengers

Passengers entering the city on any of the lines via St Kilda Road could obtain a transfer to Spencer Street by changing either at Flinders, Collins or Bourke Streets. Also passengers on a city bound tram from Toorak could transfer at Domain Road and travel to St Kilda Beach instead of the city. Various concessions were introduced for a period and then discontinued. For a time books of tickets were sold at concession rates. From 1893 return tickets (3d) were available on some routes and city section tickets were sold at 1½d each (in strips of 8 for 1/-) Concessions for school children were introduced in 1895 and for Members of Parliament in 1901.

In 1902 city section passengers were permitted to ride some distance beyond the limits of the city proper. From 1893 to 1912 there were return tickets available to St Kilda Beach which included admission to the famed sea baths. Other concessions offered from time to time included free travel for returned servicemen, for police and members of State Parliament and for visiting naval personnel.

(Strips of tickets - mainly for convenience - were sold in the 1930s City Section (yellow) 8 for 1/-; two pence (grey/blue) 6 for 1/- and three pence (red) 8 for 2/-. Scholars' tickets were sold in books of 100 (the number of sections varied according to the journey) and were obtained on application with a signed form from the school. Scholars tickets were pink colour for cable cars and yellow for electric cars - this system operated from 1st February, 1895.

Information made available by MMTB

"SCHEDULE OF PASSENGER FARES

The Passenger Fares charged by the Melbourne Tramway and Omnibus Co Ltd at 30th June, 1916, have not been substantially amended. The more important fares are as follow:

Cash Fares

3d. For a through journey over the Toorak, Prahran, St Kilda (Brighton Road, and St Kilda (Esplanade) routes.

2d. For a through journey on any line except the above-mentioned routes, and for specified sections on such routes.

1½d. For workmen only for through fare on all routes, by special morning and evening trains.

/1d. For

1d. For the following sections:

Richmond Line	-	Between Spencer Street and Swanston Street.
Clifton Hill Line	-	Between Johnston Street and Clifton Hill terminus.
South Melbourne Line	-	Between the intersection of Clarendon and Park Streets and the South Melbourne terminus.

Concession Ticket Fares

Twelve tickets for 2/9.	Available over all lines, entitling the holder to certain transfers to other lines.
Six tickets for 1/-.	Available over all lines upon which a 2d. cash fare is payable.
Eight tickets for 1/-.	Available over the City Sections of all lines, upon an area, the boundaries of which are as follow:

Upon the North - Victoria Street Upon the West - Spencer Street
" " South - Flinders Street " " East - Spring Street.

BRUNSWICK RETURN TICKETS, 3d. Available for return to Brunswick on all days except Sundays and Holidays. Sold only before 9 a.m.

WORKMEN'S TICKET, 1½d. Sold only on workmen's morning trains for return journey at any time on all days except Sundays and Holidays.

SCHOOL TICKETS, at 9s. per 100. For scholars under 17 years of age attending schools registered by the Board. Available only between residence and school between 8 a.m. and 1 p.m. on Saturdays, and 8 a.m. and 6.30 p.m. upon other days. Not available on Sundays, Public Holidays or during school vacations.

ROUND TRIP TICKETS (Adults, 9d.; Children, 5d.). Issued by the Board and the Prahran and Malvern Tramways Trust, covering a Day Return Round Trip over specified tramways of the Board and the Trust.

/COMBINED TICKET,

COMBINED TICKET, 2d. Issued by the Board and the Melbourne, Brunswick, and Coburg Tramways Trust, covering a journey between City Road, South Melbourne and Princes Street, Carlton, via St Kilda Road, Swanston Street, Madeline Street, and Lygon Street.

CHILDREN'S FARES. Children over three and under twelve years of age - half of any 2d. or 3d. adult cash fare."

Conductors usually commenced collecting fares from passengers at the rear end of the trailer working their way forward to the front end. To collect fares from passengers riding on the dummy they 'gracefully' moved from trailer to dummy, quite effortlessly, and continued with their task. It was usual for the conductor to return to the trailer car as soon as fares had been collected from passengers returning along the tram only as required.

The trip-slips were carried in a special container built under the roof over the platform of the trailer car and the conductor took one as required pinning it to his jacket (on the rather large safety pins provided). Depending on the amount of traffic (passengers) he may have had several of the same denomination attached to his tunic until he reached the end of the journey when there was a complete change and reconciliation of cash. Money collected was carried in the tunic pocket (the small cost of fares did not cause the conductors to have large amounts of cash accumulate). At the end of each round trip, conductors paid their takings to the cashier situated in the depot.

The bell punch was phased out in groups of lines operating ..

Flinders Street	22nd November, 1921
Elizabeth Street	12th June, 1922
Collins Street	11th September, 1922
Bourke Street	22nd October, 1923
Swanston Street	11th February, 1924,

... and discontinued

Victoria Street	11th September, 1922
Clifton Hill	22nd October, 1923
Fitzroy	11th September, 1922
Port Melbourne	11th September, 1922
Toorak	11th February, 1924
North Melbourne	12th June, 1922
Brunswick	12th June, 1922
Richmond	22nd November, 1921

BELL PUNCHES FOR TRAM TICKETS

May be Revived

7th JAN 1936

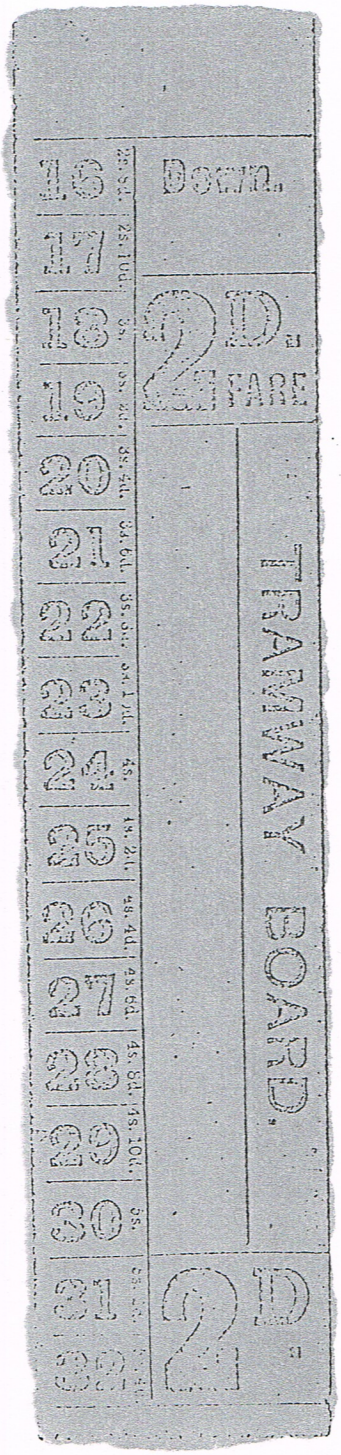
The bell punch system of issuing tram tickets may be revived in Melbourne soon. The tramways branch of the Railways Department, which has been negotiating with Bell Punch (Australasia) Ltd., a branch of a London company, is now considering the question of experimenting with the system on the St. Kilda-Brighton line.

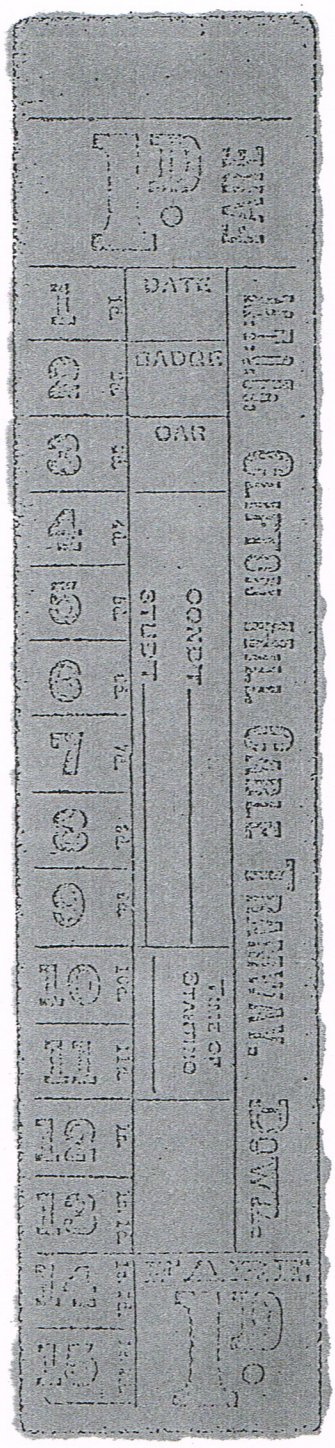
The bell punch, which has been successfully operated in Great Britain, removes all chance of a ticket being used more than once. As the punch closes on the ticket it automatically rings a bell attached to the conductor's coat. Each ring is registered, and every fragment punched from the tickets is collected in the punch, and can, if necessary, be checked over later. The number of tickets sold is thus registered by the machine and by the conductor's ticket butts.

Experiments carried out recently in Sydney showed remarkable results. Bell punches were used for a period on two city lines, one short and one long, and cash returns from these two lines revealed an increase of 8½ per cent. in comparison with a corresponding period for the previous year. The revenue improvement was attributed in part to improving conditions generally and to the normal variations in tram traffic, but it is claimed that an increase of even 1 per cent., directly attributable to the bell punch system, would more than justify its permanent establishment. A decision has been postponed in Sydney, however, until the Commissioner for Road Transport and Tramways (Mr. Maddocks) returns from England, where he intends, among other things, to investigate the system as it operates there.

A bell punch system was in operation in Melbourne some years ago, but difficulties were experienced in obtaining adequate supplies of ticket paper. This paper, which is slightly thicker and more resistant than the paper generally used in Australia for tram tickets, can now, it is stated, be produced in the Commonwealth.

STRIP TICKETS OF VARIOUS COLORS WERE WORN BY CONDUCTORS WHEN THE BELL PUNCH SYSTEM OPERATED UNTIL 1922. THE TICKETS WERE ATTACHED TO THE JACKET BY LARGE SAFETY PINS.





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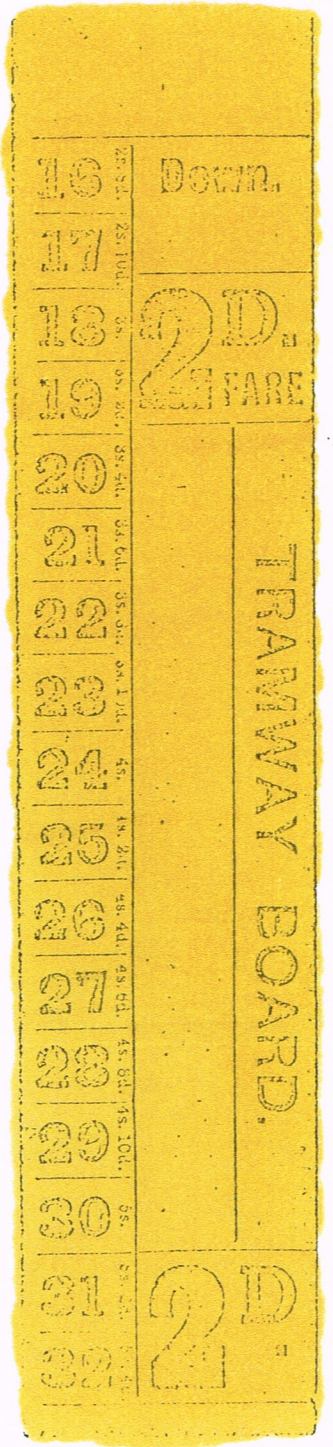
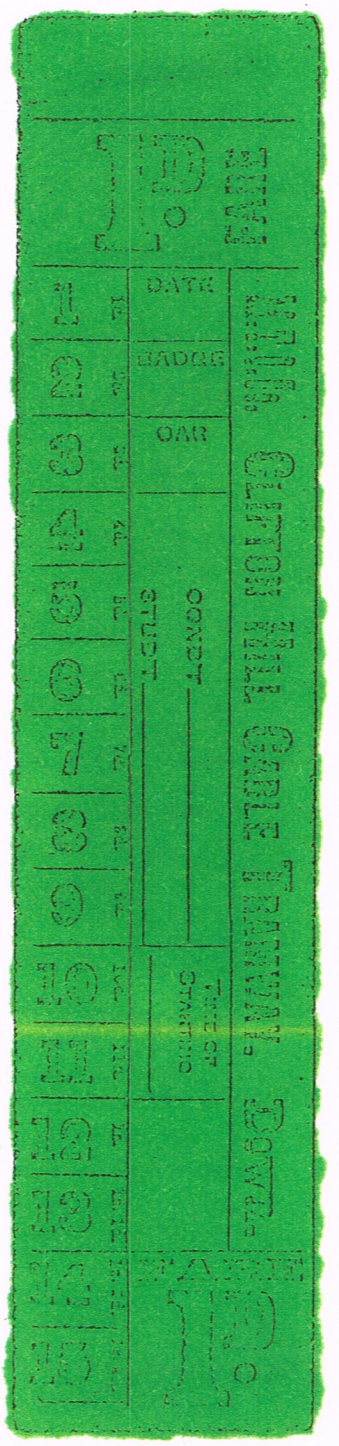




ROUTE COLOURS

The destination (route) of each tram was indicated by colour. The dome on top of the roof of the dummy and the point on top of the bell were painted in the selected colour and passengers were able to make easy identification. In the front of the elevated portion of the dummy roof a panel of coloured glass assisted identification at night but this was not really very effective. The night light was actually installed on the trailer car above the platform whilst the aprons at each end of the trailer were painted in the route colour with the suburban name in large letters. The colour of the lights showing the route were not necessarily the same as the colour displayed in the daytime but they were well advertised and well known to passengers. No two routes indicated by the same colour ran in the same city streets.

Route colours were as under:

Richmond Nicholson Street	Blue	
Brunswick Carlton Northcote Prahran Victoria Bridge	Red	Night lights were the same colour.
North Carlton North Melbourne South Melbourne	Green	
North Fitzroy Toorak	Yellow	White light.
Windsor/Esplanade	Yellow	Red light.
Brighton Road Port Melbourne	White	Amber light.
West Melbourne	Chocolate	White light.

There were changes from time to time ...

When North Fitzroy and South Melbourne lines were amalgamated the route colour was green and showed green lights at night.

When Collins Street line was closed for conversion North Fitzroy trams operated between the engine house and terminus showing red by day and night.

/South

South Melbourne service retained green. When the M.M.T.B. throughrouted North Melbourne to Brighton Road, the colour for the whole route was WHITE with AMBER light for night. West Melbourne dummies were given BLUE domes but it was not for long - February, 1924 to July, 1925. North Melbourne line resumed running to the Elizabeth/Flinders Streets shunts and the route colour was returned to GREEN and West Melbourne back to WHITE. Brighton Road cars were throughrouted to North Carlton with domes showing GREEN to the North and WHITE to the South as they passed through Swanston Street - this arrangement lasted but a few months until Swanston Street was closed in December, 1925.

During the latter days of service on the West Melbourne line, the route colour carried on the dome was WHITE although the M.M.T.B. stated the route colour was chocolate. The night light colour was WHITE. This route traversed from the engine house at Abbotsford/Queensberry Street corner to Flinders/Elizabeth Streets via Spencer Street.

During 1919/1920 domes on the dummies were removed, but following many complaints were gradually replaced.

For many years, the route traversed was carried on the side of the trailer cars and this can be seen in early pictures of the system. However, when the M.M.T.B. took over, cars were gradually painted a uniform brown and cream colour apparently to make them available for any route.

The last trailer, with the highest number, to carry street names and suburban signs was No. 564. This trailer traversed the North Carlton - St Kilda Beach line and construction believed to be around 1918. There was a lull in new building after the completion of 564, but overhauls and renovations went on normally so other cars would reappear later still decorated with various colours and sign written destinations.

When new building recommenced, cars 565, 566 and 567 appeared on the North Melbourne route painted green with no street signs. Cars 568, 569 went to South Melbourne with the new brown and cream tones. Cars 570 and 571 to Nicholson Street, plain blue. No. 572 to North Fitzroy - brown and cream. Then No. 573 plain red to Victoria Street and No. 574 to Abbotsford also plain red (no signs). After that all trailers were painted brown and cream. (The last trailer, sighted by Mr Twentyman, using the old type signs was No. 239 on the Nicholson Street line. It had been rarely used during the past three years.

DESTINATION BOARDS

There is no record when destination boards were erected on dummies, but they were introduced fairly early after the system commenced operating - it is believed to have been adopted when the Collins Street lines opened. However, a picture (August 1887) shows at the opening of the Clifton Hill line a dummy is without destination boards and side staunchions.

When the Lonsdale Street to Collingwood and North Carlton cars operated after the closure of Swanston Street route, colours were:

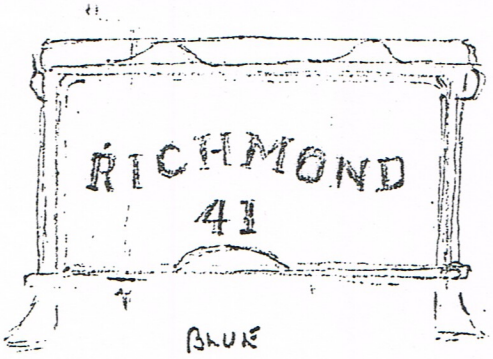
Collingwood RED

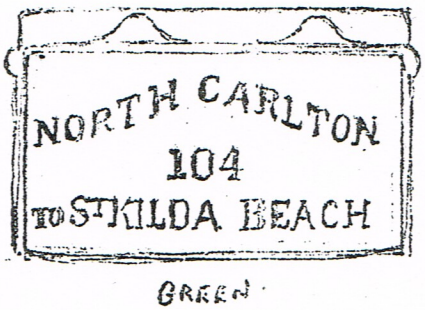
North Carlton GREEN

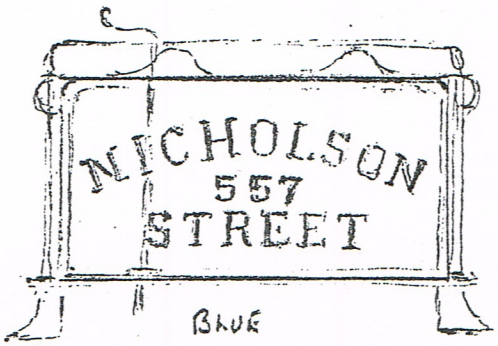
Trailer cars carried a triangular destination board at each side - North Carlton, Collingwood, Lonsdale Street - to enable the trains to be interchanged on the route.

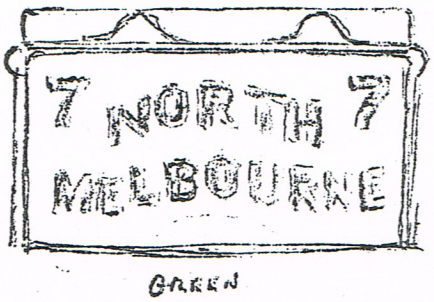
On the Bourke Street line, dummies carried destination signs that could be turned to show either Clifton Hill or Northcote. These were silver lettering on a brown base. A quadruple sign on all trailers carried Northcote, Clifton Hill, Spencer Street, Depot and the required destination was turned to face outwards.

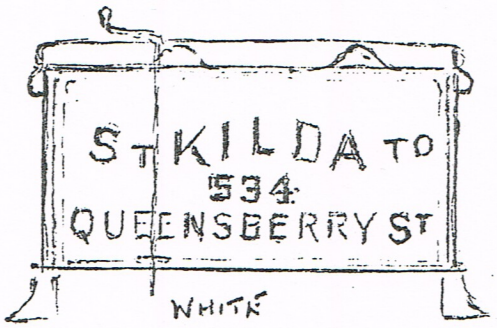
(Early destination signs on electric cars also carried a route colour. This was in the form of two discs positioned just above the destination blind. During the 1920s, destination blinds were illuminated from the rear and showed the destination very clearly - this system still operates (1972).

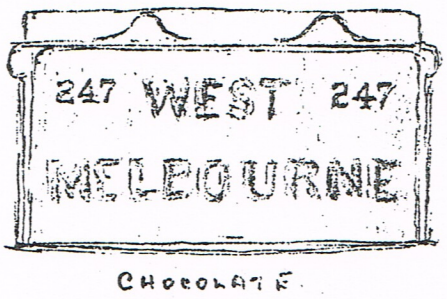












DIAGRAMS showing the route and car number on the aprons of the cable trailers. Aprons were painted in the route color and no two (same) colors operated along the one track.

DIAGRAM showing the rear end of cable trailer during MT & O Company operation. The apron was painted in the route color and the signal lamp is located above the left hand window.

THE DUMMY AND TRAILERS

DUMMY

Seating capacity - six passengers on each longitudal seat and two on each lateral seat - total 20.

Crush load - eight standees each side and six on rear of dummy - 22 plus 20 seated plus crew of two - total 44.

TRAILER (four wheel)

Seating capacity - eleven passengers on each longitudal seat - total 22.

Crush load - 18 standees in car plus 16 (eight on each platform) plus 22 seated - total 56.

TRAILER (bogie)

Seating capacity - seventeen passengers to each longitudal seat - total 34.

Crush load - thirty standees in car plus eight on each platform plus thirty-four seated - total 80.

In early days of service double-banking was introduced to move heavy passenger traffic - one dummy hauling two (four wheeled) trailers.

WIND SCREENS from the "ARGUS" of 30th August, 1922

"Wind Screens for Cable Cars.

Experiments are being made by the Tramways Board with types of wind screens for the front of cable-car dummies to protect passengers from dust, rain, and wind. A dummy of a car on the Nicholson Street-Bourke Street route was fitted up and a running test made, after which the device was taken back to the workshop for modification. The chief engineer of the board (Mr H.S. Dix) said yesterday that a further test would be made in a few weeks with this wind screen. It was not certain that the board would finally approve of the device, but if it did wind screens of the approved pattern would be installed on all the cable cars."

The wind screens were never introduced.

LIGHTING OF THE CABLE TRAMS

For the greater part of the running of the system, the lighting on both dummy and car was poor. A large box containing a kerosene lamp was carried in the front of the dummy - this being changed from end to end by the gripman at each terminal. The only lights carried in the trailer car were two small kerosene lamps at each end and situated behind the signal (route) light. As the newspaper reports of 1916 show, experiments were made for improvement. It was during the early 1920s that electric lighting was installed operated by battery power. A headlamp at each end of the dummy, a light over the gripman and two in the trailer roof with two smaller lights behind the signal (route) colour provided the illumination. Batteries, recharged daily, were carried on both dummy and car. Interior lamps were 36 watt - 6½ volt - Signal Lamps 2½ watt - 6½ volt.

From the "ARGUS" 6th July, 1916

"LIGHTING CABLE TRAMS

Electric System Tested

A cable car, with its dummy, that left the Nicholson street tram sheds at 8 o'clock last night attracted a great deal of attention, and many unsuccessful attempts were made to board it. The public, who, for thirty years, have been accustomed to the 'dim religious light' of kerosene lamps on the cable trams, were drawn to this brilliantly lit car as moths to a candle, but the order was that no ordinary passengers were to be carried; the only people permitted to ride on the first trip to the city were members of the Tramways Board and the press representatives.

The board is making an experiment with electric lighting. A small dynamo, placed under one of the end seats of the dummy, is driven by a chain and sprocket from the axle, but as this would give a fluctuating light owing to variations in speed, the current is fed to the lamps through storage batteries. The lights in the trailer are of 82 candle power, and there is a 32 candle power light under the roof of the dummy. Electricity has also been substituted for kerosene in the headlight. The experiment appeared to be perfectly successful, and the experts on the tram said that the cost would be a negligible quantity.

With the old system of lighting, it is possible only to read when sitting close under the lights in the trailer, and then reading is a sore trial to all but the strongest eyes; on this car and its dummy it was possible to read with ease anywhere."

/From

From the "ARGUS" 24th November, 1916

"Lighting of Cable Trams

Last night saw the close of a three weeks' trial of a new method of illuminating the Melbourne cable trams. For that period one tramcar on the Elizabeth street line has been lit by the 'Kerogene' plant, invented by Mr Thwaites, of Melbourne. The illuminant is kerosene; there is one lamp in the car, and the kerosene is carried in a cylinder under the seat, which holds a fortnight's supply. The kerosene is pumped into the lamp and vaporised; it is burnt in the form of gas. An important feature of the lamp is that a blow-pipe arrangement burns up the carbon in the kerosene, and prevents it from choking the lamp. One gallon of kerosene is enough to keep the lamp going between 60 and 80 hours, and the light given is a remarkable improvement on the dim, religious light of the present kerosene lamps in the cable cars. Tenders are now being called for the lighting of the cable cars."

MELBOURNE & METROPOLITAN TRAMWAYS BOARD.

CABLE ROLLING STOCK - GENERAL INFORMATION.

	DUMMIES		CARS	
	4 Post	6 Post	Standard	Bogie
Length Overall (drawheads or drawbars)	16'8⅛"	16'1"	23'8"	31'6½"
" Over Roof	15'9⅝"	15'5⅛"	22'1¼"	30'1¾"
" " Dashes	15'10⅛"	15'3"	22'1"	30'0½"
" " Saloon			15'11⅜"	23'11⅛"
Width Over Drip Rails			7'0¼"	7'0"
" " Steps	& 7'2⅜"	7'2⅜"	6'10"	6'9⅝" max.
" " Roof	7'1½"	6'8⅜"	6'7⅝"	6'7⅛"
" " Band Panel	7'2⅛"	6'9⅛"		
" " Fence Rail			6'7⅛"	6'7⅛"
" " Pillars	7'0¼"	7'0¼"	6'6¼"	6'6½"
" " Underframe	3'7⅜"	3'7⅜"	6'0"	6'0"
" " Crown-piece	6'11¼"	6'7⅜"	5'11⅜"	5'11⅛"
" " Platform Maximum)			5'4⅜"	5'4⅜"
Minimum)			4'10⅜"	4'10⅜"
Width of Door			2'1"	2'1"
" " " Opening			1'8½"	1'8½"
" between Seats			2'10"	2'10⅛"
Height of Vehicle above rail	10'1"	10'1" over dome)	9'3" max	9'6" max
" " Floor " "	18½" to 19½"		24¼" to 25	26⅛"
" " Platform " "	13" to 14½"		22⅜ to 23¼	24½"
" " Sill (under) "			21⅛ to 22¼	24"
" " Step " "	13" to 14¼"		12 to 12⅜	13⅜"
" " Dash above platform	2'2⅝"	2'2⅝"	2'10½"	2'10⅜"
" " Door Opening			5'11⅝"	5'11¾"
Weight - Grip 3½ewt	54 cwt (Est)	53c 3qrs	49ct 3qrs	88 cwt (Est)
Wheel Base	4'6"	4'6"	6'0"	15' (trucks 4')
Seating Capacity	20	20	22	34