



A Profile of Tramways in Kolkata - A Sustainable Urban Public Transport

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Abstract

Transportation is one of the foremost catalysts of the urban economy as it gives the necessary pace to it by means of connection between and among the places. The basic transport modes that serve commuters and other people to move in and around the urban area are Bus, Cabs, Trains, Metrorail, Ferry, and Trams. Among them, the tram is the only non-polluting as well as a sustainable mode of mass transport. In India, Kolkata is the only city where the Tram is till now operating. The cab is very expensive, unfriendly for mass transit of passengers and also polluting one. Buses carry less number of passengers compared to trams and exert a huge black fume in some cases. And Metro rail on the other hand, although apparently seems to be non-polluting but it exerts substantial pollution effect by means of its tremendous sharp sound which is so harmful and involves a huge costing for constructed operation and management. In this respect, tramcars stand out in comparison to other vehicular modes within the transportation system of Kolkata for its uniqueness. However, Kolkata is the only city where this service is still running with remarkable transformation in terms of its decreasing coverage area, passenger turnover, earning and basic infrastructure over the years. In the case of developed countries, the Tramways case is different. The present paper attempts to trace the underlying scenario of spatio-temporal dimensions of tramways of Kolkata and identify the management and technical gaps to be redressed. To comprehend the overall present picture, tramcars professing passengers, operators, maintenance workers, management personnels are interviewed, and historical perspective is also added, to collect data from the reliable sources.

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Introduction

Urban transport is a medium through which people, goods, and services are transported from one part of the city to another and keeps the urban life dynamics. A proper urban transport should facilitate a reliable, safe, time-bound, environment and pocket-friendly and comfortable journey. Any million plus city should plan for a good efficient public mass transit system (Report of Ministry of Urban Development, 2006). In the field of urban mass transportation of Kolkata, the first organized effort was made by the tramways during the late 19th century (Halder, 2008). Trams are cheap, pollution-free and one of the safest mode of transport. Being run on electricity but an accident rate is almost negligible. It stands out as one of the most efficient modes of mass transport in the present world. But in many cases today, it causes the emission of other motor vehicles more than they normally do by creating obstacles against the smooth

running of motor vehicles. According to the Centre for Science and Environment (CSE), the quantity of all three major air pollutants namely, CO, hydrocarbons, and nitrogen oxides, drastically increase due to the reduction of motor vehicle speeds. Although it is very safe and disciplined as it moves along its track. Moreover, as a cheap, comfortable, luxury and overall peaceful journey, the tram is the most dependable one. Its speed is reduced furthermore from the expected one due to many interventions in front of it.

Materials and Methods

The study is based on the analytical probe of secondary data collected from various officials such as Works Manager-Nonapukur, Chief Engineer (Overhead & Cable), Chief Accounts Officer, Law Claims Officer and others of West Bengal Transport Corporation (WBTC), the amalgamation of



Calcutta Tramways Company and other state-owned transport corporations, head office and depots as well as termini under it. Besides, data have been also collected from Kolkata Metropolitan Development Authority (KMDA) and Bureau of Applied Economics and Statistics, W.B. In addition to that primary data has been collected through administering survey schedule among of the employees of trams in WBTC at the depots and termini and also of the passengers, commuters, and pedestrians in the areas served by trams.

The Study Area

The selected area for study is the Kolkata Municipal Corporation (KMC) extended from 22°30'N to 22°37'N and 88°18'E to 88°23'E. It comprises 142 wards clustered in 15 boroughs with an area of 187.33 km² and a total road space of only 6 percent of the total built-up area. It has a population of 4.58 million (Census of India, 2011) and a passenger load of 18.70 million on an average weekday (KMDA, 2011).

Phases of Origin

Trams have served the city of joy as one of the major modes of transports since its inception in 1880. Since the time trams made its maiden journey from Sealdah to Armenian Ghat, it has gone through vast modernizations and still rolls down the tracks of Kolkata. Kolkata has remained the Capital of the British Indian Empire for 137 years. Trade and commerce flourished and a fast mode of transport was, therefore, necessary to make trade commercially more viable. This was well understood by Mr. Parish Alfred of London and Mr. Chauter of Liverpool. With the co-operation of Kolkata Municipal Corporation, they incorporated the Calcutta Tramways Company Limited (CTC) in 1880. The same year on 10th November tramways was introduced in Kolkata with horse-drawn coaches. The main idea behind the inception of tramcars was to carry goods arriving from villages at Sealdah for transport to different parts of India through Railways. The merchandise had to be unloaded at Armenian Ghat and then carried on boats or bullock carts to Howrah Station. India holds the pride of being one of the few countries of the world to run tramcars. In the past trams ran in the cities of Kolkata, Delhi, Mumbai, Chennai, Nasik, and Kanpur. But Delhi, Mumbai, Chennai, Nasik, and Kanpur have terminated their tram service during the early and mid-twentieth century. Opening and closing years of these tramways are shown in Table - 1.

Profile of Tramcars and Networks

Presently WBTC holds around 220 operational fleets, out of which 50 to 60 trams on an average are put on the road which plies through the heart of the city covering track length of about 40 km operating from 6 depots and 7 termini out of which very few are presently in operation. The Fig.-2 shows that the tram network of Kolkata has gone through a modification to a considerable extent since its inception. The tram service in Kolkata was first incepted in 1873 from Sealdah to Armenian Ghat which was subsequently closed in that year. Most of the lines have been incorporated in the British Raj Period. The post-independence period extension of tramlines was very little. Unfortunately, this period witnessed a havoc closure in the frequency of tram services. Recently an opinion trend in

administrative level is often heard that tram causes congestion in Kolkata and as a result of it, a lion's share of tram routes have been subsequently closed which are shown in the map with their year of closure. But such a trend of opinion is nothing but the result of apparently wrong perception and lack of appropriate awareness and conception about eco-friendly and cheap mass transportation.

Table- 2 shows that the overall passenger carriage is varying with routes. The thing of utmost significance is that the number of passenger carriage is substantially high in the segregated track, i.e. Esplanade to Khidderpore part due to its hassle-free motion. On the other hand, the passenger carriage is comparatively low in the part of Howrah Bridge and Rajabazar section due to excessive traffic pressure and common sharing of the road with other mass transport modes. In all the total passenger share of the tram is comparatively low due to the absence of timely availability and hindrances.

As far as closure of tramways is concerned it has been seen that the introduction of new lines and closure of the existing lines have gone side by side. The first closure occurred in 1971 when Howrah to Bandhaghat and Shibpur line was closed. In 1973, Burrabazar to Nimtala line was closed. In the year 1980, several lines were closed. Among them, Esplanade to Jatin Das Park (for Metro Rail project) and Mirzapur crossing to Bowbazar are notable. In 1982, Sealdah to Lebutala line was closed. In 1995, Strand Road to High Court line was closed. In 2004, Gariahat depot to its crossing line was closed for the construction of Gariahat Overpass. In 2006, Mominpur to Behala line was closed. Similarly, in 2009, Shyambazar to Galiff Street line was closed. In 2011, Joka to Behala Line was closed due to the construction of the Metro rail project. Lastly in 2016-18, Park Circus lines, Sealdah- Moulali lines, etc have also been terminated. Belgachia portion is although under maintenance, but most of the officials have opined that there is hardly any possibility of reopening of this line. As a result, there is a considerable decrease in the number of tramcars too (Fig-3).

Depot and Terminus

A *Tram Depot* means a garage or sheds for the trams where ox-bow fashioned or linear fashioned lines are present to change the direction of tram after it finished the journey at that place and they are kept after the diurnal tram service is over. In case of Calcutta Tramways, the code name is imprinted in front of the tramcar of the respective depot it belongs to. For example, BL is the code form of Belgachia depot and this code is written on each tram of this depot.

A *Tram Terminus* means an in-transit place where ox-bow fashioned or linear fashioned lines are present to change the direction of tram after it finished the journey at that place. From the figure (Fig 4), it may be said that the concentration of the tram depots and termini follow the differential importance of urban space in Kolkata i.e. the higher commercial and nodal value in respect to commutation lies more in Central Kolkata. Besides, in reference to table-2, it is important to note that, in spite of the existence of the said depots and terminus, BBD Bag, Belgachia, Kalighat and Galiff Street are presently not in function. The officials have given a number of reasons in support of it. But the matter of utmost concern is that, in all the previous experiences, it has been observed that the once closed



service of tram route has never been restarted in Kolkata. If this trend continues, these depots and termini are on the verge of extinction.

Drivers and Conductors: The Running Staffs

Calcutta tramways have huge manpower which is basically constituted with the drivers and conductors of the tram. They are the most important persons to make a tram trip proper. Besides, in each depot and termini, there are some maintenance staff and one or two starters. But when a tram is on road, the only staff present in the tramcar is the Driver and the Conductor. In WBTC trams, each car has two conductors in case of a 2-coach tram and one conductor in case of a single one. There is one driver in each tram. They are appointed either as a nominee or by direct recruitment. Presently, as of 2017, they are total 750 in number which shows an exact ratio of 2 conductors and 1 driver for a double coach tram. Their pay scale is the same as of a clerk of Writers'. But since 1992, there was no permanent recruitment for the operation of trams.

Commuters' Profile

Trams, in the years of its inception served a huge population. However, the daily passenger volume has been decreasing over the years from 2803 lakhs in 1975-76 and 2246 lakhs in 1984-85 to a mere 70 lakh passengers at present, which is still a very significant number in comparison to the total passenger volume of the city. Daily passengers may constitute an average of about a hundred in each route, though they vary significantly on holidays. These people board trams for purposes like a journey to work, regular shopping trips, etc. Among the surveyed passengers most of them were non-regular passengers who travel in tram either once a week or hardly. However, the survey shows that females between the age-group of 30-60 years and males between the age-group of more than 60 years usually travel daily. Passengers record a maximum of male passengers between the age-group of 30 to 60 years (Fig-5).

People choose tram as a mode of travel usually because of the smooth and comfortable journey it provides through the busy streets of the city. Kolkata displays an uncontrolled mix of incompatible forms of traffic in its streets, resulting in overtaking, congestion and therefore frequent accidents. A tram follows a fixed track and is not responsible for overtaking and the vices thus caused, instead ensures a safe journey. It is seen that people over 60 years on board a tram particularly because of its smooth and disciplined journey through the tracks. The other factors which lead to the choice of tramcars as a mode of transport are its negligible accident rates, its low fare structure, and its less crowded bogies. The fact that it is eco-friendly, does not usually guide a person's choice of mode though the survey showed that there were quite a few exceptions i.e. mainly aged people and school going and returning students and guardians (Fig-6).

Current Situation

From the diagram aside (Fig-7), a clear picture is presented here about the economic condition of Calcutta Tramways. It is shown here that the expenditure is rising continuously throughout the time whereas the income is quite disappointing. There is no significant increase in the income of the tramways. As a result of

this incident the all over service is degrading day by day and proper care is lacking in its operation.

From the diagram (Fig-8), it is observed that among the mass transport modes of roadways i.e. Bus, Minibus and Trams, Bus and Minibus are far behind the Tram with respect to passenger carrying capacity while compared with fuel consumption. When a bus and Minibus carries 80 and 50 passengers on average optimality, a double coach tram can carry nearly 200 passengers in an optimum average condition in a more or less same fuel consumption rate. A bus/Minibus costs Rs.15-16/km whereas a tram costs Rs. 12-13/km. Moreover, there is a huge oil crisis in present-day whereas the electricity is self-producing and the fuel i.e. current used by tram is non-polluting.

Recommendations

- a) A detailed study should be undertaken to examine the feasibility of replacing the present tram system by LRTS (Light Rail Transit System) on some selected corridors to act as an intermediate mode of mass transit. Some of the prospective routes may be- along B.T. Road from Shyambazar to Dunlop Bridge, along E.M. (Eastern Metropolitan) Bypass, along Belgharia Expressway, along Foreshore Road in Howrah, along Diamond Harbour Road to Joka, along VIP Road (Kazi Nazrul Islam Avenue), etc.
- b) As an attempt to recover the loss, some tramcars should be prepared for heavy goods carriage from the city fringe to city core and provision for separate tracks for their movement. Such track may be provided in the bypass routes where public traffic is less. If this proposal can be properly implemented, then the congestion due to huge sized lorries can be minimized in many areas which are notoriously known for jam.
- c) Modernization and automation of the depots, termini, and workshops should be done and technological measures should be taken to reduce the noise of tramcars and make a smooth and less jerking movement. Some of the modern facilities should be incorporated in the coaches i.e. A.C., Wi-Fi facility only in the coaches, music system, GPS for live tracking, stop announcement, etc. They can attract passengers.
- d) A proper route-wise time schedule must be prepared to keep in mind the peak and lean time of passenger's demand. In this regard, it may be incorporated with those smartphone apps which the passengers use to locate their transport modes. Above all, the punctual execution of the time table is very necessary in this regard.
- e) Wherever possible segregated tract should be introduced to facilitate faster movement as well as let other vehicles move smoothly.

Conclusion

The matter of utmost astonishment is that while the developing countries like Germany, Czech Republic, Switzerland, U.K., etc are trying to enriching their tram service and making it as a highly dependable mode of commutation, India, more specifically Kolkata, in spite of having basic infrastructural settings, are impoverishing this medium day by day. To improve urbanization and to save the pride of tramways of Kolkata, tram development oriented schemes, integrating and coordinating



policies and interventions should be vigorously adopted. However though it has lost much of its hype, sheer, and luxury, and drastically reduced in number in the era of luxurious cars and bikes, tramways system in Kolkata would probably take yet another decade to fade away. It has still managed to brave the odds and thrives in the roads of Kolkata with its same old promise of a safe, comfortable and smooth journey as during its glorious days along with eco-friendliness and sustainability fulfillment. What is lacking, however, is the care once Kolkata had for its most convenient and the cheapest mode of commuting in the city. There is a need for rethinking. Reorientation of the undertaking, efficiency in management, rationalization of routes and modernization of the system would help the tramways to provide valuable service to the city.

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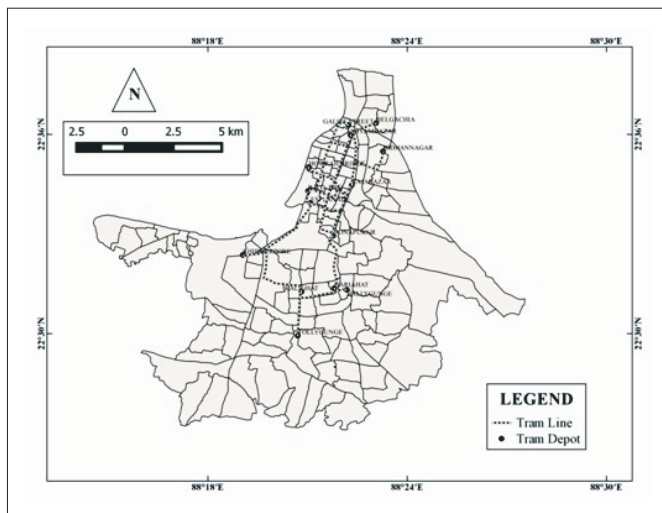


Fig. 1: Network of Tramways in Kolkata (2018)

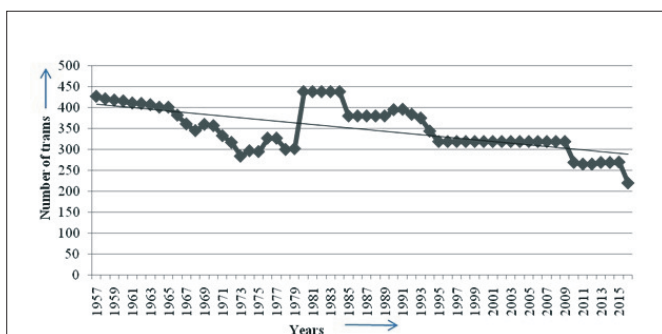


Fig. 3: Trend of Tram Service during the Post-Independence period

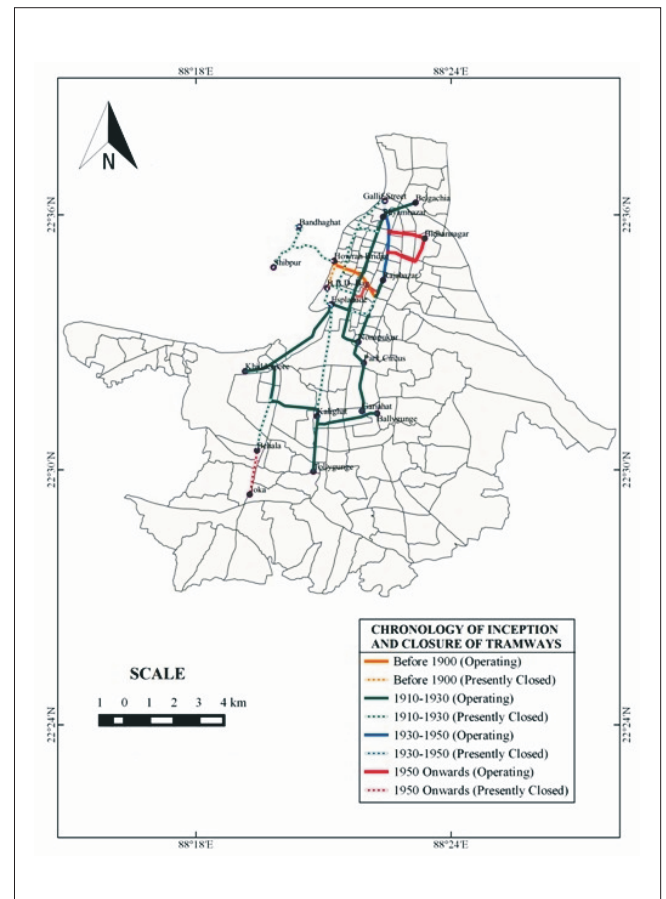


Fig. 2: Growth and decay of Tramway Network in Kolkata

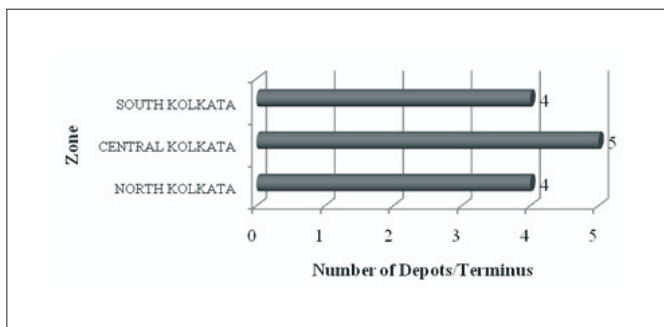


Fig. 4: Distribution of Tram depots and termini

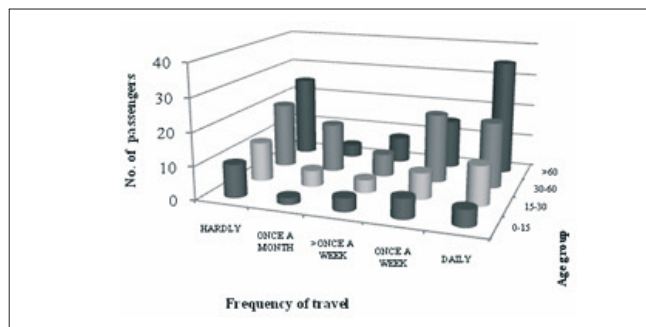


Fig. 5: Travel Frequency (Source- Field survey, 2018)

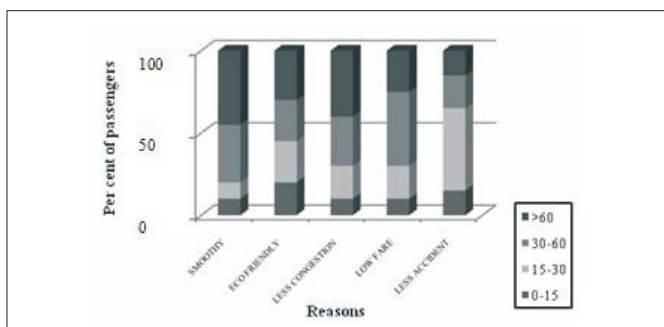


Fig. 6: : Reasons for Travel (Source- Field Survey, 2018)



Fig. 7: : Contrast between Income and Expenditure (Source: WBTC, 2018)

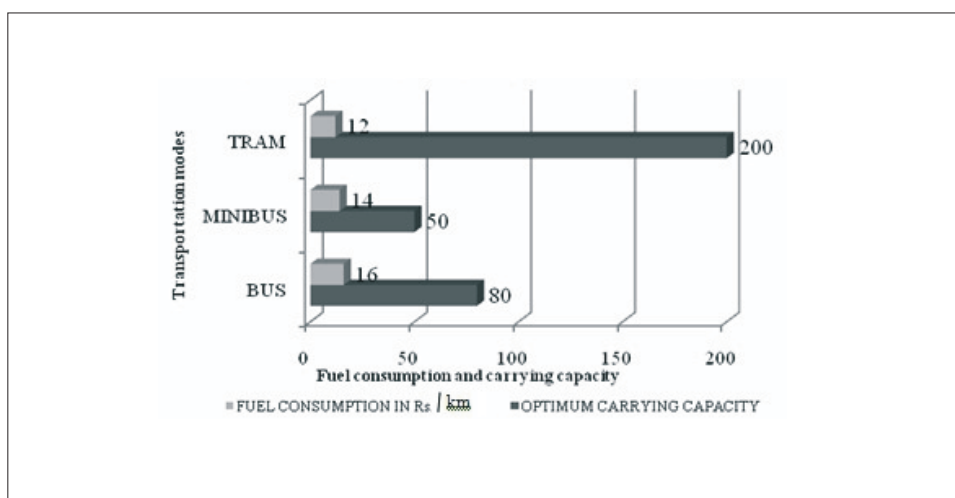


Fig. 8: Comparison of passenger carrying capacity (Source- Experts of Motor Vehicles and Trams, 2018)

Table-1: Year of Opening and Closings of selected Tram Systems in India

City	Opening Year	Closing Year
Kolkata	1873	Running
Mumbai	1874	1964
Nasik	1889	1933
Chennai	1895	1953
Kanpur	1907	1933
Kochi	1907	1963
Delhi	1908	1963
Bhavnagar	1926	1947

Source: WBTC Office, 2018



Table - 2: Temporal profile of the tram routes of Kolkata

Route No.	Year of commissioning	Year of closure	Whether segregated/elevated or not	Origin (Depot)	Destination tail end/depot	Total length in km	Double tracked through out or not	No. of trips per day (up-down)	Passengers ferried per day	Earning (Rs) per day	Remark
1	1903	Open	No	Belgachia	Esplanade	7.29	Yes	NA	NA	NA	Closed due to Repairing
2	1920	2018	No	Belgachia	BBD Bag	6.81	Yes	NA	NA	NA	-
4	1920	2018	No	Belgachia	BBD Bag	6.92	Yes	NA	NA	NA	Via Grey Street
5	1903	Open	No	Shyambazar	Esplanade	5.13	Yes	5	300	1800	-
6	1920	2017	No	Shyambazar	BBD Bag	5.13	Yes	NA	NA	NA	-
8	1920	2017	No	Galiff Street	BBD Bag	5.13	Yes	NA	NA	NA	-
10	1920	2018	No	Shyambazar	BBD Bag	5.13	Yes	NA	NA	NA	Via Grey Street.
11	1903	2018	No	Belgachia	Howrah Bridge	6	Yes	NA	NA	NA	Closed due to Repairing
12/1	1915	2017	No	Rajabazar	Esplanade	3.19	Yes	NA	NA	NA	-
12/7	1905	2017	No	Galiff Street	Esplanade	6.92	Yes	NA	NA	NA	-
14	1915	2017	No	Rajabazar	BBD Bag	4.81	Yes	NA	NA	NA	-
15/12	1915	Open	No	Rajabazar	Howrah Bridge	3.6	Yes	4	100	600	-
16	1985	2017	No	Bidhannagar	BBD Bag	7.15	Yes	NA	NA	NA	-
17	1985	2018	No	Bidhannagar	Esplanade	6.62	Yes	NA	NA	NA	-
18	1985	Open	No	Bidhannagar	Howrah Bridge	8.15	No	3	80	480	-
20	1923	2014	No	Park Circus	Howrah Bridge	6.85	Yes	NA	NA	NA	Via Wellington
20/17	1923	2014	No	Park Circus	Bidhannagar	9.25	No	NA	NA	NA	-
21	1923	2014	No	Park Circus	Howrah Bridge	7.75	Yes	NA	NA	NA	Via College Street
22	1923	2013	No	Park Circus	Esplanade	5.65	Yes	NA	NA	NA	-
24	1928	2015		Ballygunge	Esplanade	10.5	Yes	NA	NA	NA	-
24/29	1928	2015	No	Tollygunge	Ballygunge	4.66	Yes	NA	NA	NA	-
25	1930	2017	No	Gariahat	Esplanade	8.65	Yes	NA	NA	NA	-
26	1930	2016	No	Gariahat	Howrah Bridge	9.68	Yes	NA	NA	NA	-
26/17	1985	2014	No	Gariahat	Bidhannagar	12.5	No	NA	NA	NA	-
29	1903	Open	Part	Tollygunge	Esplanade	4.99	Yes	8	450	2700	-
29/36	1910	Open	No	Tollygunge	Khidderpore	7.55	Yes	7	350	2100	-
36	1902	Open	Part	Khidderpore	Esplanade	4.99	Yes	8	500	3000	-
36/8	1903	2001	Part	Khidderpore	Bagbazar	9.7	Yes	NA	NA	NA	-
-	2016	Open	No	Rajabazar	Bidhannagar	5.2	No	6	250	1500	-

(Source: Prepared by the authors based on WBTC data, 2018)



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Table - 3: Tram Depots and Terminus under WBTC

Depots	Terminus
Belgachia (BL) (Temporarily closed for repairing)	Bidhannagar
Rajabazar (RB)	Shyambazar
Gariahat (GH)	B.B.D. Bag (Closed)
Kalighat (KG)(Closed)	Esplanade
Tollygunge(TG)	Howrah Bridge
Khidderpore (KP)	Galiff Street (Closed)
Nonapukur(Workshop)	Ballygunge (Closed)

(Source: WBTC Data, 2018)