TRAMWAYS – AN ECO – FRIENDLY MODE OF MASS TRANSPORTATION: A CASE OF KOLKATA

Eshita Boral,

Junior Research Fellow
Department of Geography,
University of Calcutta, India

ABSTRACT

The principal function of any transit system is to carry passengers efficiently and in large numbers. Tramcars stand out in comparison to other vehicular modes within the transport system of Kolkata for its uniqueness. This cheap, electrically operated pollution-free mode, having a high carrying capacity is the most viable option for crowded cities like Kolkata. Slow though it may be, it ensures a safe journey through the madding crowd. Populated cities of the world are reviving the Tramways system since it runs on electricity and has a high carrying capacity. However the situation in Kolkata is quite different. There is a constant rise in passenger demand but the proportion met by tramways system has been decreasing over the years, particularly because of the strong competition it has to face with buses. Undoubtedly thus the Calcutta Tramways Company has been running at a loss for quite some time. Experts therefore are considering to do away with tramcars from the transport system of Kolkata. But it is to be noted that replacing trams would not only be costly but also environmentally harmful. CTC has a long history of running tramcars and is believed to posses the experience that is required to run such a transit system in the city. The present paper is an attempt to look into the position of tramways as a means of mass transportation within the transport scenario of Kolkata and to assess the issues and concerns of retaining tramcars in the city instead of removing them.

Keywords: Tramcars, transit system, pollution-free mode, retention, revival, passenger load, travel demand.

INTRODUCTION:

Urban Transport is a medium by means of which people, goods and services are transported from one part of the city to another. Proper urban transport should be efficient, reliable, safe, economic and comfortable. Any million plus city should plan for a good and efficient public mass transit system (Report of Ministry of Urban Development, 2006). In the field of urban mass transportation in the city of Kolkata the first organized efforts were made by the tramways towards the closing years of the last century (Halder, 2008). Trams are cheap, pollution-free and one of the safest mode of transport. Being run on electricity with an accident rate which is almost negligible it stands out as one of the most efficient modes of mass transport in the present world.

THE STUDY AREA:

The selected area for study is the Kolkata Municipal Corporation (Lat. 22°30′ N to 22°37′ N, Long. 88°18′ E to 88°23′ E). It comprises of 141 wards in 15 Boroughs, with an area of 187.33 sq. km and a total road space of only 6% of the total build-up area. It has a population load of 4.58 million (Census of India, 2011) and a passenger load of 18.70 million on an average week day (CMDA report, 2011).

DATABASE AND METHODOLOGY:

The research is based on an analytical study of the secondary data collected from Calcutta Tramways Company (CTC) head office and depots under it and from Calcutta Metropolitan Development Authority (CMDA). Primary data was derived through questionnaire survey of employees of CTC at the various depots and termini and of daily commuters, passengers and pedestrians. The data was then analysed and processed to determine the situation of tram services in the city.

LITERATURE REVIEW:

For preparation of the research study books, journals and reports have been consulted. D.K. Halder (1977) in his book "Urban Transport Problem" deals with tramways system in Kolkata in a chapter entitled The Calcutta Tramways, where he puts forward the position of trams within the transport scenario of Kolkata and highlights the pros and cons for retention of tram services in the city. D.K. Halder (2008) in his another book "Studies in Urban Transport" focuses on the prospects and retrospects of Calcutta Tramways in a chapter. He emphasizes the fact that withdrawal of trams from streets of Kolkata is not a very wise decision and provides prospects for revival, retention and expansion of tram services in the city. The report entitled "Sustainable Transport Solutions for Calcutta" prepared in 1996 is an assessment of the transport and environment situation in Kolkata. It provides a brief description of all the modes of transport that are in operation in the city of Kolkata and states that the tram system is one of the best in the world in terms of its network and has enormous potential to play a key role in a sustainable transport solution for Kolkata. "Transport Planning And Management With Special Reference To Kolkata" (2012) provides a comprehensive plan for the construction and operation of transport facilities in Kolkata. It looks into the reasons for decline in the performance of tram services in the city and provides ways by which various modes of transport can operate in the city for dealing with the increasing passenger load. The KMDA report "Comprehensive Mobility Plan - Back to Basics : Kolkata Metropolitan Area" looks into the existing traffic and travel characteristics of the city and focuses on economic, environmental and socially sustainable mobility recommending the development of integrated mass transport system for the city. It highlights the advantages and disadvantages of tramcars and puts forward suitable measures for its retention.

TRAMWAYS SYSTEM IN KOLKATA:

Trams have served the city of Kolkata as one of the major mode of transport 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 the City of Joy.

Kolkata has remained the Capital of British Indian Empire for 137 years. Trade and commerce flourished in the area 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 were introduced in Kolkata with horse drawn coaches. The main idea behind 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 Kolkata is only city in India at present which has retained its tramways.

CALCUTTA TRAMWAYS COMPANY (CTC):

The CTC manages tramways in Kolkata. Calcutta Tramways is a Government Company under the Companies Act, 1956 where the entire Share Capital of the Company lies vested with the Governor of the State of West Bengal.

CHRONOLOGY OF DEVELOPMENT:

- The British started The Calcutta Tramways Company Limited as a registered joint stock company at London, in 1880.
- Electrification of Tramways and simultaneous reconstruction of tracks to the standard gauge (4'- 8½ ") was taken up in 1990.
- In the year 1951 The Government of West Bengal entered into an agreement with the Calcutta Tramways Co and the Calcutta Tramways Act, 1951 was enacted.
- The Government of West Bengal took over the management on 19th July 1967.
- The Government took over all rights with regard to Tramways and reserved the right to purchase the system in 1972.
- In 1976 the Calcutta Tramways vested all its power with the Government.
- It was converted in to a Government Company in February, 1983 in the name of "The Calcutta Tramways Company (1978) Limited" in terms of The Calcutta Tramways Company (Acquisition of Undertaking) Amendment Act, 1978.
- At present the Company is under the administrative control of Transport Department, Government of West Bengal.

Presently CTC holds around 319 fleets of which 239 are operational. On an average 170 trams are put on road, which ply through the heart of the city covering track length of about 66 km operating from 7 depots and 11 termini.

FLEET STRENGTH:

The reports of Calcutta Tramways Company shows that the fleet strength has decreased over the years from 485 fleets in 1975-76 to 438 in 1984-85 to 350 in 1993-94 and to 319 in 2007-08. It was only during 1987-88 that three cars were purchased but since then fleet strength have shown a decrease in number. This has also reduced the average number of fleets put on road /day from 284 in 1975-76 to 302 in 1984-85 to only 99 in 2007-08.

ROUTE AND ROUTE LENGTH:

The Calcutta Tramways Company operates on 11 routes presently. In 1977 there were 26 routes which increased to 29 in 1987 and to 33 in 1990-91. Since then the total number of routes has been 29 upto 2004-05. However the total route length run by the tramcars remained constant at 62 km from 1975 onwards though in 1971-72 it ran a length of 106 km. Presently it runs a total route length of 66 km in double track.

STAFF STRENGTH:

The staff strength as in 2006 was 4955. The traffic comprising of Drivers, Conductors, Supervisors and others amounted to 2109. The Workshop maintenance was looked after by a staff strength of 1715, Administration was under 618 staffs and casual workers comprised of 513 staffs.

TOTAL EARNINGS AND NET PROFIT/LOSS:

The financial position of the Calcutta Tramways Company has been deteriorating for a fairly long time. Though total earnings of the company increased from Rs. 106 lakhs in 1967-68 to Rs. 430 lakhs in 1975-76 and Rs. 774 lakhs in 1984-85, profit of Rs. +18.42 was last made in 1966. Since then it has experienced losses at a tremendous rate - from Rs -389 lakhs in 1975-76 to Rs. -879.65 lakhs and Rs. -1323.32 lakhs in 1984-85. At present the total earnings from sale of tickets is 650 lakhs and from other sources is 456 lakhs. However the expenditure at present is more than the total earnings amounting to 13179 lakhs. This increasing loss greatly accounts to the significant decline in passenger numbers with introduction of other modes of public transport in the city, particularly buses run by the State Transport Corporation. To add to the situation private operators also started running buses on the streets of Kolkata. It therefore became difficult for CTC to meet the frequency of buses on roads, leading to loss of passengers to more frequent bus services.

INFRASTRUCTURE:

Infrastructure consists of both Physical Infrastructure (i.e. depot, terminus and workshop, tracks and the tramcars) and Human Infrastructure (i.e employees).

DEPOTS:

CTC operates its tram services through 7 depots and 11 termini located in North, South and Central Kolkata. Excepting Tollygunge depot and Behala and Joka termini all the other depots and termini lie within the maximum population concentration zone where the passenger load is highest (Fig 1).

Table 1: Depots and Termini under CTC

DEPOTS	TERMINI
Belgachia (BL)	Bidhannagar
Rajabazar (RB)	Baghbazar
Park Circus (PC)	Shyambazar
Gariahat (GH)	B.B.D. Bag
Kalighat (KG)	Esplanade
Tollygunge (TG)	Howrah Bridge
Khidderpore (KP)	Galiff Street
	Ballygunge
	Behala
	Joka
	Wattgunge

Source : Calcutta Tramways Company

Location of Depots and Termini Under CTC

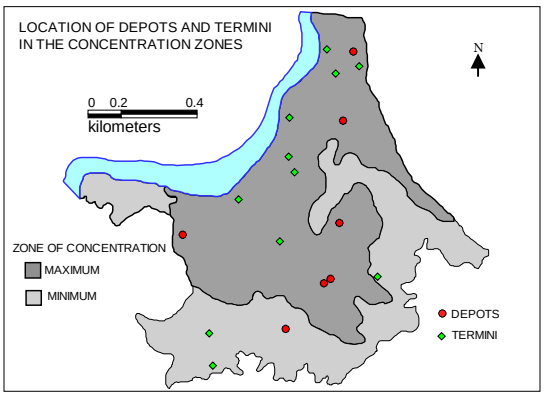


Fig1: Data Source : Calcutta Tramways Company

Each of these Depots having been on service on from 1880 hold a certain amount of fleet operating on various routes. There is however a significant gap between the fleet held and the running fleet in all the depots, as many of the cars is not in running condition. The Depots are under the supervision of a Traffic Officer and Traffic Superintendents who practically look after the Human Infrastructure. The Physical Infrastructure of the depots is under the supervision of the In-charge of the Tram Engineering department which operates from the Nonapukur tram depot. The Emergency Breakdown Services of CTC operates from Esplanade terminus.

Present situation shows that many of these depots and termini have closed down because of reconstruction of roads and other factors.

DEPOTS CURRENTLY CLOSED:

- **1993 -** Howrah Station terminus closed and tram tracks removed on Howrah Bridge; the cantilever bridge proved too weak for trams. All routes terminated there were shortened to the Barhabazar (Howrah Bridge) terminus (formerly Barhabazar Junction).
- **1995 -** High Court terminus closed for reconstruction of Strand Road. Rails and wires were removed from there and from Strand Road, Hare Street and Shahid Kshudiram Basu Road.
- **2004 -** Garhiahat Depot – Garhiahat Junction link on Gariahat Road closed for construction of the Gariahat overpass.

- **2008 -** Galiff Street terminus realigned.
- **2011 -** Joka-Behala stretch and Behala depot closed down for construction of the Joka-BBD Bag metro project; Ballygunj-Kalighat stretch closed for reconstruction. Lalbazar-Mirjapur down line was closed but up line still exists.

WORKSHOP:

The company has its own workshop and a staff for repair and maintenance of tracks at Nonapukur. It is responsible for keeping roads in condition to the extent of eighteen inches beyond the outer rails of tram tracks (Halder, 1977). In case of breakdown of tramcars the workshop is in charge of repairing the damages.

TRACKS:

There are 80 km double track of standard gauge in operation of which only 35 km are reserved and 45 km unreserved track. Tram tracks have become major source of problem due to inadequate maintenance, non-investment of capital and mixed traffic operation. The track profile is very irregular with gaps and elevation changes at many of the 3000 crossings. Much of the track is in need of total replacement which needs major investment. Many of these tracks have also become non-operational.

TRACKS CURRENTLY NOT IN OPERATION:

- **2006 -** Mominpur – Behala stretch on Diamond Harbour Road closed for construction of an overpass at Taratala. Initially, there was a plan to route tracks on that overpass, but the road was later converted to a National Highway and the plan dismissed.
- **2007 -** Wattgunge Junction – Mominpur Diamond Harbour Road, Mominpur – Jatin Das Park Judges Court Road, Jatin Das Park – Kalighat - Shyama Prasad Mukherjee Road routes closed for reconstruction and have not yet reopened.
- **2009 -** Tracks on R. G. Kar Road from Shyambazar five-point crossing to Belgatchia tram depot closed down for reconstruction and has recently reopened.

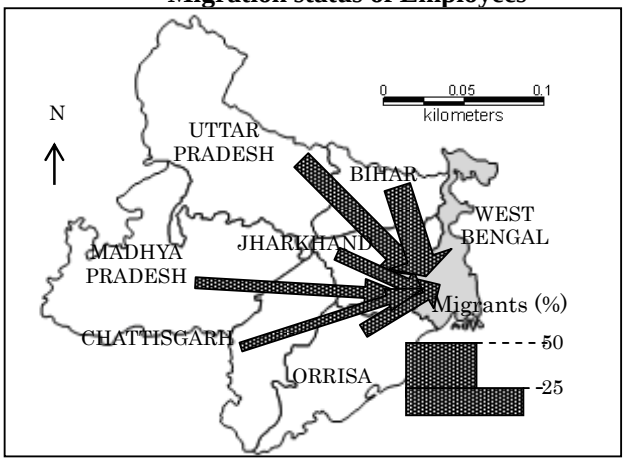
TRAMCARS:

Since its inception as horse-driven mode, tramcars have undergone several revisions and the trams in Kolkata today are articulated with two cars each with passenger seating, and one driver's cabin without any vestibule or door shutter. They are 2.1m wide and 17.5m long weighing 20 – 22 tons when empty. The traction supply is at 550V DC, supplied by an overhead catenary's system. The catenary's is at a negative potential and the return current is carried by underground return conductors at a positive potential. The current is drawn by trolley pole. The Track gauge is Standard Indian gauge – 5 feet 6 inches (1,676 mm). Each car seats 62 and carries 200 at full load running at an average speed of about 25 km/h (15.5 mph). It costs around Rs. 8 lakh for a comprehensive overhaul of a tram, the life span of which is 50 -80 years.

DRIVERS AND CONDUCTORS:

Each Depot has a number of Drivers and Conductors working under the Starter who in turn works under the Traffic Officers and Superintendents. They are appointed either as a nominee or by direct recruitment. Percentage of migrant employees from the adjoining states of Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, Chattisgarh and Orissa are quite significant in number (Fig 2).

Migration status of Employees



Employees daily Schedule

- Working hours – 8 hours
- Working Schedule – Morning shift 4:30 am to 8:45am
  Evening shift 11:45 am to 16:45 pm
- Average income – varies from Rs. 8000 to Rs. 12000 monthly including gross.
- Incentives – Incentives got daily on the basis of tickets sold. Drivers getting half the amount that a conductor gets.

Source : Primary Survey

Fig 2: Data Source : Primary Survey

PASSENGERS' PROFILE:

This mode of mass transit system was introduced to help in fast movement of goods and people from one place to another. Therefore in the years of its inception it 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. Presently it carries 272 lakh passengers, which is still a very significant number in comparison to the total passenger volume of the city.

TYPE AND AGE GROUP OF PASSENGERS:

There are a definite group of passengers who travel by tram daily. The survey shows they mostly constitute school-children, factory workers and the older section of the society. The majority of male passengers lie in the age-group of above 60 years (Fig 3). Two types of passengers in this category were identified. The first group constituted of those who are retired and use this mode for daily shopping trips or for moving from one place to another within the city limit. The second group have business of there own or are engaged in other sort of jobs and use this mode for journey to work trips. Among female passengers the majority fall between the age group of 30-60 years who are mostly housewife on there way to drop and collect their wards from school or to do daily shopping. However the proportion of male and female passengers also varies with routes, e.g. route no. 2 and 6 has more average male passengers than female passengers since it runs through the Central Business District constituting mostly office-goers.

AVERAGE INCOME OF THE PASSENGERS:

Passengers traveling in a tramcar fall under various income groups. But however for the purpose of the study, to establish whether there is a difference in the socio-economic status between passengers boarding 1st and 2nd class an attempt has been made to form few categories in terms average income earned by passengers. The study shows that passengers are mostly of middle and lower income group, higher income people constitute only a very small portion of the travelers (Fig 4). In a 1st class boogie people with an average income ranging from Rs.1000 to Rs.15000 travel - the maximum number ranging from income group Rs. 5000 to Rs. 10,000. While those of 2nd class usually constitute of passengers between the income groups Rs.1000 to Rs. 5000. However the survey also derives the fact that preference to travel in 1st or 2nd class does not always depend on income level of passengers. Rather passengers are more attracted to the lesser crowded boogie of the two, though this trend is not so significant.

Age – Sex structure of Passengers availing tram service in Kolkata

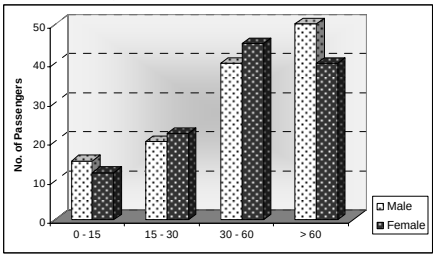


Fig 3 Data Source : Primary Survey

Average Income level of passengers availing tram service in Kolkata

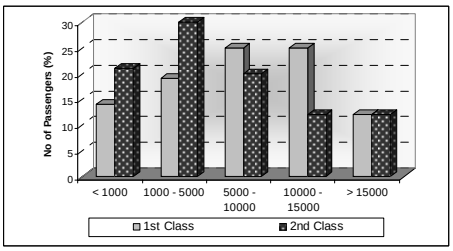


Fig 4 Data Source : Primary Survey

FREQUENCY OF TRAVEL :

Daily passengers may constitute to an average of about a hundred in each route, though they vary significantly on holidays. These people board trams for purposes like 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 survey show that females between the age-group of 30-60 years and males between the age-group of more than 60 years usually travel daily in the 1st class. 2nd class passengers on the other hand record a maximum of male passengers between the age-group of 30 to 60 years (Fig 5).

PURPOSE OF TRAVELING :

People mostly board a tram car for personal purposes. Traveling in tram cars is cheaper than other modes of transport so when people are not in much hurry they prefer this comfortable vehicle. The survey showed that

people prefer traveling by bus, metro or auto while on the way to any official purpose. Office-goers in trams constitute only 20 percent of the total. Personal purposes of travel include shopping, social visit or other purposes constitute about 25 percent of the total.

Frequency of travel of passengers availing tram service in Kolkata

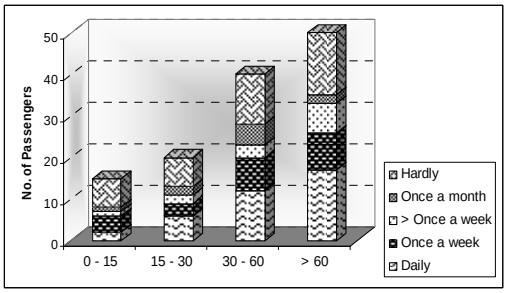


Fig. 5 Data Source : Primary Survey

Reasons for choice of tramcars as mode of transport for passengers in Kolkata

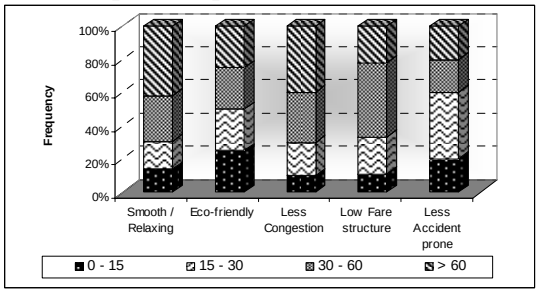


Fig. 6 Data Source : Primary Survey

REASON FOR TRAVELING IN A TRAM:

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 accidents. A tram follows a 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 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 survey showed that there were quite few exceptions (Fig 6).

SHOULD TRAMS STAY IN THE TRANSPORT SYSTEM OF KOLKATA?

Kolkata's tramways network is a priceless asset which should be preserved. But by the end of the 20th century insisting that city hit the fast lane, it was decided by the government of West Bengal to do away with tram tracks. However second thoughts have triumphed with transport conceding that Calcutta trams are here to stay.
Many European countries who in the 1950s and 1960s had discarded trams for being slow, obsolete and a source of traffic congestion are now spending millions of dollars re-laying tracks and bringing back trams because they are eco-friendly, efficient and economical. The state government has the rare opportunity to learn from the mistakes of others. What the network does require is refurbishment and modernisation. The state government has signed an agreement with ICF Kaiser International Inc. to conduct a feasibility study for modernisation of CTC. Not only is the government to be blamed for such decisions many an individual (as the survey results show) are advocating in favour of withdrawing tramcars, though a considerable portion of people are still in favour of its retention.

DISADVANTAGES:

The two most powerful arguments disfavouring tram services are – on one hand, their inability to easily adapt to the changes in the route system and on the other hand their adverse effect upon flow of other vehicular traffic in streets, particularly where separate right of way is not available (Halder, 2008). The slow speed of the vehicle is itself partly responsible for traffic congestions. Frequent derailment and failure of overhead system, decreasing frequency and difficulty in boarding and alighting from tram cars particularly where it runs through the middle of the road also poses a problem. Not only the number of tram cars, actually running on the road, has been decreasing progressively, the quality of the service is also deteriorating at a faster rate (Halder, 1977). The tram tracks are not renewed in time and due to bad joints it causes vibrations in the adjacent area. The conditions of roads where tram cars are operated are also extremely poor which increases the risk of other vehicles which move through the same route. Further more the organization entrusted to run tram services is not profit making and government cannot bear the burden of loss. Its patronage has reduced from 12 lakhs in 1962-67 to only 1.5 lakhs in recent years whereas the population of the city is increased by 100 percent.
The difficulties faced by the drivers and conductors are also worth mentioning. Overtaking by other vehicles, parking of vehicles on tram tracks, poor condition of the tracks, movement against one-way traffic, alteration of

tracks at the turnings and problems of breakdown and power cut causes huge problems in operation of the system. The pedestrians too face huge problems when there is a breakdown at any road outlet and where stoppages for other modes lie on tram tracks. They also face difficulty in crossing roads where there are tram tracks, since poor maintenance of these tracks often lead to development of large holes along tracks particularly during rainy season.

ADVANTAGES:

However there are several advantages of tramcars which strongly support the retention of this rich heritage. Trams being run on electricity do not create pollution and is eco-friendly. It is most disciplined vehicle as it follows a track and do not change its route frequently. This ensures reaching the allotted destination, except during breakdown, therefore is of great reliance. Due to its low floor, it is very easy to board and alight from a tramcar particularly for the children and the old. It is almost totally accident free. There has been no report on tram causality and injury of passengers inside a tram car for many years. The fare structure is low and is suitable for poorer section of the society. It is slow no doubt, but can increase speed upto 16 km/ hour if tracks are reserved for it. Therefore it is a mass transit system, meant for different economical class, which very efficiently can meet the increasing passenger demands in Kolkata, provided it is allowed to run on dedicated tracks free from intrusion of other vehicles.

TRAM VERSUS BUS IN KOLKATA:

Buses are the most common mode of mass surface transport at present in Kolkata and have provided Trams a strong competition since its inception. Therefore it is necessary to analyse the position of each with respect to the other.
Probably the most important standpoint for trams is its passenger carrying capacity, which is higher than buses plying the streets of Kolkata. The optimal loading capacity of trams in Kolkata is 200, as against the average capacity of buses being 78. Tramcars with their immense passenger carrying capacity occupy a much lesser space in carrying the same amount of passenger by any other mode in the city. However this relatively slow-moving vehicle with a total length of 17.5 meters often causes obstruction to speedy movement of traffic and leads to traffic congestions particularly if there is a breakdown. Such jams increase travel time for commuters. But it should be noted that congestions in Kolkata is a result of various other factors also like narrowness of roads, illegal parking on the side of the roads and on tram tracks and a mixed form of traffic occupying the same road space. Recent studies have shown that the average speed of buses and trams in the prevailing conditions in Kolkata do not vary to a great extent, being 9.5 km and 8 km per hour respectively if right of way is provided to each. As it moves on fixed rails, trams, cause little jerk and have minimum possibilities of accidents, thus ensuring a comfortable and smooth journey particularly for old, disabled or handicapped and children. Many cities of the have special provisions for movement of this section of society but since trams run in the streets of Kolkata, such expenses in introducing special modes are avoided. Being run on electricity trams does not pollute the environment by releasing harmful gases like other modes. A World Bank study stated almost ten years back that more than 10,000 people in Kolkata die annually due to air pollution (Douglas, 2005). Moreover the present day oil crisis is of great concern to the world and any mode which saves the almost exhausting resource is most welcome particularly when it can handle a significant number of transit passengers.
Economically it has been estimated that though the initial capital cost of a tram is higher in comparison to buses. And even the maintenance cost of trams are quite high (Rs. 82 lakh) as compared to buses (Rs. 30 lakh), its operational cost is lesser. This low operating cost stands as an advantage of running tramcars on the existing routes provided some improvements on these tracks are made. It is to be noted here that the cost of maintenance of tram tracks including the portion of roads that are under the company are to be borne by them. But in case of buses the maintenance of roads are not borne by bus operators. It is said that if the cost of maintenance of roads is added to the maintenance cost of buses, it will become higher than that of trams.
Replacing the existing stock of tramcars would require double number of single-decker buses, but since there is already a shortage of buses meeting the increased travel demand purchasing new buses just to replace the existing service of tramways does not seem very rational (Halder, 1977). Therefore it could be stated that the overall economic desirability of it as a means of mass transport is much greater than any other mode (Halder, 2008).

CTC IS IN AN ADVANTAGEOUS POSITION FOR REVIVAL:

It has been found that CTC is in an advantageous position for a revival. The major reason is it is much easier to add bit by bit to an already existing system than to build a new one. The system of network already exists in the city therefore no major investment is required. The CTC workshop has expert craftsmanship for tramcar

overhauling and equipments regarding tramway operation are also available. Most importantly there are no dearth of passengers. Having an experience of running trams for nearly a century, CTC is in a position of revival in the city of Kolkata which essentially qualifies all requirements to have an efficient tramway.

CTC'S EFFORT FOR THE REVIVAL:

The efforts taken by CTC towards this goal are

i. Improving the existing stock by increasing its efficiency **:**
   Efforts have been taken to upgrade the existing technology, modernizing the tracks, overhaul system and rolling stocks. Ladies special trains have been introduced recently.
ii. Reviving it in a new form **:**
   The new-look trams had come to operation from the month of September, 2008 and started operating in Route no. 1 and 5 from Belgachia Depot and Route no. 25 from Gariahat Depot. These cars have beautified both in the interior and exterior, and have been installed with indicators, UPS etc.
iii. Introduction of Light Rail Transit System **:**
   A detailed study should be undertaken to examine the feasibility of replacing the present tram system by Light Rail Transit System on some selected corridors to act as an intermediate mode of mass transit. The prospective rout of L.R.T. may be-
   a. Along B.T.Road from Shyambazar to Dunlop Bridge
   b. Along E.M.Bypass
   c. Along B.K.Express way-Dumdum Barrackpore Express way
   d. Along Foreshore Road in Howrah
   e. Along D.H.Road to Joka
   f. Along Kaji Nazrul IslamAvenue

Due to the efforts' of CTC it has been able to revive its situation. Increased frequency of trams and introduction of modified trams have steadily increased the passenger numbers. However it would take several more years to regain its original grandeur, provided it maintains its system significantly well.

CONCLUSION:

However though it have lost much of its hype, sheer and luxury, and drastically reduced in number in the era of luxurious cabs and bikes, tramways system in Kolkata would probably take yet another decade to fade away. It has still managed to brave the odds and thrive in the roads of Kolkata with its same old promise of safe, comfortable and smooth journey as during its glorious days. 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. It is the one of the best mode of transport in global parameter which will have a better prospect.

REFERENCES:

[1] Dasgupta, Anupam; Sengupta, Arghya and Saboo, Nikhil (2012) : 'Transport Planning And Management With Special Reference To Kolkata', Transport Planning And Management, West Bengal University Of Technology, Kolkata.
[2] Douglas, Michael (2003) : 'Imagining Transports of Sustainability', International Journal of Humanities, Vol 1.
[3] Douglas, Mick (2005) : 'Tramjatra - Imagining Melbourne and Kolkata by Tramways', Yoda Press, New Delhi and RMIT University Press, Melbourne.
[4] Government of West Bengal (1967), 'Traffic and Transportation plan for the Calcutta Metropolitan District (1966 – 1986)', Calcutta Metropolitan Planning Organization (CMPO), Kolkata.
[5] Government of West Bengal (1967), 'Economic Review– Statistical Appendix' Bureau of Applied Economics and Statistics, Kolkata.
[6] Ibid 1971 - 1972
[7] Ibid 1975 - 1976
[8] Ibid 1978 - 1979
[9] Ibid 1980 - 1981
[10] Ibid 1981 - 1982
[11] Ibid 1983 - 1984
[12] Ibid 1987 - 1988

[13] Ibid 1990 – 1991
[14] Ibid 1993 - 1994
[15] Ibid 1997 - 1998
[16] Ibid 1999 - 2000
[17] Ibid 2000 - 2001
[18] Ibid 2003 - 2004
[19] Ibid 2007 - 2008
[20] Ibid 2010 – 2011
[21] Government of West Bengal. (2001) : 'Master Plan for Traffic and Transportation in Calcutta Metropolitan Area (2001-2025)', Calcutta Metropolitan Development Authority, Kolkata.
[22] Government of West Bengal. (2008) : 'Comprehensive Mobility Plan - Back to Basics : Kolkata Metropolitan Area', Calcutta Metropolitan Development Authority, Kolkata.
[23] Halder, D.K. (1977), 'Urban Transport Problem', Academic Publishers, Calcutta. pp. 62 – 88.
[24] Halder, D.K.(2008), 'Studies in Urban Transport', Bookwell, New Delhi. pp. 161 – 169.
[25] Sarkar, P.K. and Tagore, Pratiti. (2011) : 'An appraoch to the development of Sustainable urban transport system in Kolkata', Current Science, Vol 100 No. 9.
[26] Sarkar, Aveek (November 13, 2005) : '*Holes in Heart*', The Telegraph
[27] Sarkar, Aveek (May 17, 2005) : '*Centre poser on highway tram tracks*', The Telegraph
[28] Sarkar, Aveek (March 15, 2005) : '*Wind-up cloud on transport corporation*', The Telegraph
[29] Sarkar, Aveek (June 21, 2004) : '*CTC turns to land to cut losses*', The Telegraph
[30] Sarkar, Aveek (March 31, 2004) : '*Snags may force Behala-Joka tram route to shut down*', The Telegraph
[31] Sen, Sumit (September 29, 2004) : '*Danger lurks at every turn*', Times of India
[32] Sen, Sumit (June 25, 2005) : '*Tram project sparks chaos at 7- point crossing*', Times of India,
[33] Sen, Sumit (July 11, 2005) : '*Track Tomorrow (9-route light rail network to criss-cross Kolkata)*', Times of India
[34] en.wikipedia.org/wiki/tram (Accessed on 19th December 2011)
[35] en.wikipedia.org/wiki/Tram_transport_in_India (Accessed on 19th December 2011)
[36] http/www.calcuttatramways.com (Accessed on 12th March 2012)
[37] http/www.eco-logica.co.uk/pdf/Calcutta1.pdf, 'Sustainable Transport Solutions for Calcutta – A report prepared by Professor John Whitelegg of the School of the Built Environment at Liverpool John Moores University, U.K.' (Accessed on 2nd April 2012)
