ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

Critical Assessment of Cape Town BRT System

Emmanuel Adewumi[1], Dhiren Allopi[2]
Durban University of Technology[1 and 2] P. O. Box 1334, Durban, 4000,South Africa

Abstract*— Due to increasing pressure on public transport, it has become necessary to seek for a more efficient means of moving passengers, reduce travel time, delay time and numbers of stop. Bus Rapid Transit (BRT) has been adopted as an improvement on regular bus services through the combination of features like infrastructure changes that resulted in better operation speeds and service reliability. The main aim of this study is to check the performance and maintenance from the inception of the Myciti BRT system in Cape Town (CT). Physical assessment and critical review of the operating BRT system was employed in this study. The lane configuration and design are almost the same all through the routes except in some places where there are mixed traffic, at-grade median, median and segregated lanes. There is no Automatic Vehicle Location (AVL) which is connected to the control room that helps with updated schedules both inside the bus and station. Also, no comfortable seats, phone booths, bicycle and private car lots/parking is provided at the stations. High maintenance should be the watchword and if there is the need for BRT system diversification in Cape Town, other lanes should be implemented using other forms of BRT system adopting bicycle and car parking facilities at the main station which will enable a complete comparison in terms of service reliability and delay.

***Index Terms*— Vehicle manoeuvre, commuters, traffic congestion, dedicated lane.**

I. INTRODUCTION

Today, both the public and private transports are facing problems due to increase in vehicle ownership and the suburbanization of both firms and residences in the world. In the past, public transport focused mainly on the central areas of the cities where high population and employment densities enabled frequent services, high occupancy rates and many routes. As growth is reaching suburban from the metropolitan area, imperative challenge crops up in the public transport to increase its service in order to serve the commuters better, and also to integrate suburban service with metropolitan service (Pucker and Hurth 1996).

The main aim of this study is to check the performance and maintenance from the inception of the Myciti BRT system. Hence, public transport has to be made more attractive and user friendly in relation to improved service, travel information, reliability, safety and upgrading of infrastructure like waiting stations. Cost is an imperative element that influences the demand for public transport in relation to the time spent waiting, boarding and alighting from vehicles coupled with the risks and inconveniences involved in those actions. The report (Conquest Research, 1997) also suggested that commuters and business users board the fastest and most direct routes.

II. HISTORICAL DEVELOPMENT OF BRT

The large-scale development of the BRTs started in Curitiba (Brazil) in 1974, and before then, there were several smaller-scale projects earlier in its development. After the success of an effective BRT in Curitiba, its experience inspired other cities to develop similar systems (Matsumoto, 2004). In the 1970s, development of BRT systems was limited to the North and South American continent. In the late 1990s, the replication of the BRT concept gained momentum and BRT systems were opened in Quito, Equador (1996), Los Angeles, USA (1999) and Bogotá, Columbia in the year 2000 (Ernst, 2005). Especially, the TransMilenio project in Bogotá started operation in 2000 and its success drew attention from the world community as an example of the state of the art in BRT systems. As of 2005, there may be up to 70 systems around the world, depending on one's definition of BRT (Levinson et al. 2003; Wright, 2005).

III. NATIONAL OPERATING SUBSIDIES

Developing a business plan for public transport is somehow difficult for any transport authority unless they know the rate of operating subsidy that will be made available to them. At each metro or functional area, the existing level of subsidy must continue at the levels currently being allocated for bus subsidies. A judgment call will be made by the transport authority to decide which proportion of the subsidy will be allocated to catalytic initiative. In other words, it means that they have to plan for zero operating subsidies for the catalytic initiatives as they have no control over the subsidy streams, which are in place because it applied to standard buses and rail (DoT,2007a).

IV. CAPE TOWN BRT OPERATIONS

Development has spread to the peninsula area of Cape Town termed as a low-density area, which depict that there would be movement of people in the pursuit of their daily chores over a long distance. However, a larger percentage of about 3 million residents of Cape Town rely solely on public transport as their means of movement. Considering the topography of CT, there is no more space for the expansion of road or building new roads for private automobiles that might carry one person per time because it is surrounded by two oceans and table mountain range at the centre. Congestion is increasing year after year. Besides, international studies reveal that building or expansion of road network should not ease the congestion because people opt for automobile instead of using public transport. Hence, there should be great investment on public transport to classy taste in order to

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

encourage private car users to use it and alleviate congestion. This was what prompted the BRT/IRT system in Cape Town named "Myciti" (System, 2012).

The South African cabinet appropriated public transport in an integrated way in March 2007 (DoT, 2007b). The first phase of the Integrated Rapid Transport (IRT) system span through Civic Centre (CBD) to Table View as the trunk route coupled with a series of interim feeder services. Some of the routes are intersected while all the routes are connected to the Civic Centre station (Figure 1)

There are functioning operation of BRT systems in other South African cities like Johannesburg, Port Elizabeth, Pretoria and on-going implementation of such a system in Durban (Thomas, 2010).

V. On-site assessment

The method employed was an on-site assessment using a checklist system to assess the performance of the system and subject the possible pros and cons of the system (annexure 1). Myciti BRT system majorly makes use of median BRT lane configuration, that is, it is located in the middle of the roadway in a two-way direction as an exclusive right-of-way with pavement/lane marking, intersection road marking and few metres away from the main station (Civic Centre). It some places, it operates in mixed traffic, at-grade BRT system which does not need a lane marking or separator and segregated lane. The lane marking serves as a separator to the other traffic to avoid vehicle manoeuvre. It has a fully colored bus way some metres away from the Civic Centre to Table View. It has a distinctive branding/marked identity of vehicle and color that differentiates it from other public transport. Standard and articulated standard low emission vehicle technology buses with bi-fold doors at both sides and multiple entrances for boarding and alighting alongside a distinctive identity and image are used.

As the lane is located at the middle, the station is also constructed at the median of the roadway with maps, automatic doors on both sides of the station, elevator for disabled/ wheelchair accessibility, enhanced station environment, full weather protection on all the station platform, security, CCTV, information desk and telephone booth (only at the main station). Consistent pattern of station location and in few places, the existing kerb side bus stop for other public transport is adopted.

The lane configuration and design are almost the same all through except in some places where there is mixed traffic (close to Table View and others), and segregated lane along Woodstock to Zoarvlei corridor. The median of the road is enhanced with a footpath. It has streamlined shelters with no comfortable seats and real-time information display for the passengers to wait for the next available bus, but it has the following implemented in the station: CCTV, maps, specific paint scheme, logo and security. The destination could be found in the bus, there is a display of the destination in front of the bus and help could be got from the staff. The BRT buses are scheduled to operate every 20 minutes from 5h10 to 21h20 during the weekdays and 6h10 to 20h00 over weekends.

They make use of the installed CCTV on the corridors to monitor the buses in regard to theft and performance. Audio announcement and map sticks to the side of the BRT buses are used to inform the commuter of both the present and next bus stop especially to those who do not know the exact station to jump off. It makes use of only smart card (Figure 2) which is at a flat rate and only the monetary value of the card can be paid back upon the return of the card; the money loaded is not refunded. Fare verification is done in the bus.

VI. Problems/challenges

The ability to build more buy-in customers to use the system especially the private car users is important. To develop a robust business and financial model for continual maintenance of the existing system is a challenge. Continuous skills training are required for the owners and operators to maintain the success of the system. There is no Automatic Vehicle Location (AVL) which is connected to the control room that helps with updated schedules both inside the bus and station which is essential. Its operation in mixed flow traffic lane is a promising problem. No provision is made for commuter seating, bicycle and private car lots/parking at the stations.

VII. Conclusion

Use of a dedicated bus lane should be encouraged throughout the routes due to its improvement in travel time, reliability, safety and fastness when compared to other road public transport modes. A separate lane enables the system to have lower headways and accommodate higher peak period loads. When further combined with signal priority, delay is greatly minimized at intersections. Use of Automatic Vehicle Location (AVL) helps the passengers to know when the bus would arrive at the station and the exact place to jump off, especially to those who do not know the exact location of their destinations. AVL is more preferable to audio announcement in the bus. No phone booth and information display system either in the bus or station makes it below standard when compared to the standard of a BRT station. It could be noticed that where segregated lane is used, it is more efficient than the median, at-grade median, or mixed traffic lane.

Conclusively, it is commuter/user friendly and cost effective over a long distance when compared to other road public transport because it operates at a flat rate. In the system, pedestrian safety, convenient and secure access to the facility for the physically challenged and abled commuters are fully guaranteed, which makes commuters not to be discouraged about the system.

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

Fig 1: Partial route map of Myciti BRT system
Source:http://www.capetown.gov.za/en/MyCiti/Documents/MyCiTi_System_Map.pdf

Fig 2: Myciti smart card
Source:http://www.capetown.gov.za/en/MyCiti/Documents/Media/myciti_west_coast_wrap_03-2012.pdf

	Met√
Lane configuration	
Basic separator cones	
Pavement marking	√
10 cm separator blocks/studs	
50 cm separator blocks/studs	
Kerbside lane configuration	
Segregated lane configuration	
Median lane configuration	√
Bus colouration/ road markings	
Intersection roadmarking	√
Lane marking	√
Bus way with fully coloured way	√
Distinctive BRT identity and image	√
Distinctive marketing identity for the system	√
Landscaping	
Cycle paths/footpaths	√
Tree planting and grassing- it is minute	√
Additional park or civic improvement	
Integration with other modes at stations/terminals	
Bicycle parking at stations/terminals	
Formal taxi stands at stations/terminals	
Car parking at stations/terminals	
Intelligent Transportation System (ITS)	
Real-time information display	
Connection to the control station/room	
Audio announcements on BRT buses	√
Incorporate schedule data into station electronic information systems	√
Place updated schedules and [maps at stops] inside the buses	√
Adapting existing transit signal infrastructure	√
Maps and information	
Maps at station	√
Information kiosk	√
Station amenities	
Air conditioning	
Elevator for disabled	√
Automatic doors	√
CCTV/security	√
Enhanced station environment	√
Wheelchair accessible station	√
Full weather protection on all station platforms	√
Telephones	√
Security provision	√
Consistent pattern of station location, configuration, and design	√
Separate BRT, local buses, automobiles, and pedestrian movements in station design.	
Fare collection system	
Smart card	√
On-board fare collection	
Pre-board fare collection	
Fare verification	√
Flat fare type	√
Zonal fare type	
Distance based type	

VIII. RECOMMENDATION

High maintenance should be the watchword and if there is a need for BRT system diversification in Cape Town, other

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 3, Issue 1, July 2013

lanes should be implemented using other forms of BRT system adopting bicycle and car parking lot at the main station which will enable a complete comparison in terms of service reliability and delay. Mixed flow traffic lanes should be totally discouraged. Other modes of BRT system especially segregated mode to be employed in case of future BRT intensification. Phone booth, comfortable seating, bicycle space and Intelligent Transport System should be fully installed at the station.

REFERENCES

[1] Cape Town Transport Integrated Rapid System. 2012. Inside Myciti: A Guide for Stakeholders. Available: www.capetown.gov.za/myciti.

[2] Conquest Research. 1997. Quality of Interchanges, Report for London Transport Marketing, London.

[3] Department of Transport. 2007a. Public transport strategy. Pretoria.

[4] Department of Transport. 2007b. Public Transport Action Plan. Phase 1(2007-2010). Catalytic Integrated Rapid Public Transport Network Projects 24.

[5] Ernst, J. 2005. Initiating Bus Rapid Transit in Jakarta, Indonesia. Transportation Research Record 1903:20-26.

[6] Levinson, H., Zimmerman, S., Clinger, J., Rutherford, S., Smith, R. L., Cracknell, J. and Soberman, R. 2003. Transit Cooperative Research Program (TCRP) Report 90, Bus Rapid Transit : Case Studies in Bus Rapid Transit. Washington, D.C. Transportation Research Board., 1.

[7] Matsumoto, N. 2004. Analysis of policy processes to introduce Bus Rapid Transit systems in Asian cities from the perspective of lesson-drawing:cases of Jakarta, Seoul, and Beijing.

[8] Pucker, J. and Hurth, S. 1996. Verkehrsverbund: the success of regional public transport in Germany, Austria and Switzerland. Transport policy, 2 (4): 279-291.

[9] Wright, L. 2005. Bus Rapid Transit, Sustainable transport: A sourcebook for policy-makers in developing cities. Eschborn: Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ).