

Walking Accessibility for BRTS of Ahmedabad City- A Case Study

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Abstract— Public transportation is one of the most important component of urban transport system, particularly in pace of rapid urbanization in Ahmedabad city. Today in the city, the utilization of Bus Rapid Transit System (BRTS) is increasingly day by day looking for cost effective transit solutions and for environmental concerns. But the problems facing by the users to use this system are poor accessibility status. For effective planning, it is quite essential to understand the degree of accessibility of BRTS. BRTS accessibility can be considered as one of the vital factor to integrate the land use and bus route network system to promote the public transit system. The present paper focuses on measurement of walking accessibility of BRTS taking one route name as RTO to Memnagar as a case study.

Key words: Public Transportation, BRTS, Walking Distance and Walking Time Accessibility

I. INTRODUCTION

Urban area plays a vital role in providing flip to urban mobility, accessibility and efficient movement. Public transportation such as BRTS is a key component of urban transport system of a sustainable transportation system that improves systemic mobility without placing the economic and environmental burden of increased auto-ownership on the traveling population for Ahmedabad city. BRTS is a mode of transportation that involves transportation by a collective in a large vehicle and operates mostly on a fixed routes and fixed schedule with dedicated lane. For effective BRTS system, the accessibility is one of the key factors for this system.

Accessibility means access it refers to the ability for everyone, regardless of disability or special needs, to access, use and benefit from everything within their environment. Accessibility is to create an inclusive society for people with physical, mobility, visual, auditory or cognitive disabilities. This means everyone has equal access to perceive. Access is the goal of most transport activity, except the small portion of travel for which mobility is an end in itself (e.g., jogging, cruising, leisure train rides).

Present research paper shows the socio-economic characteristics and travel characteristics of the study area stretch (RTO-Memnagar) from the collected data using Bus-Stop/On board survey. The Walking distance accessibility has been also found out from the collected data of the study route.

II. OBJECTIVES OF THE PRESENT STUDY

The aim of the present study is to examine the socio-economic characteristics and travel characteristics of the study area corridor i.e. RTO to Memnagar of Ahmedabad City. The Walking Accessibility (WA) analysis has also been carried out from the collected data.

III. LITERATURE ON ACCESSIBILITY

A. Accessibility Concept:

Accessibility is often defined as the ease of travel between two locations. The Oxford Advanced Learner’s Dictionary (2000) defines “accessible” as “that can be reached, entered, used, seen, etc.” Some of the well-known definitions of Accessibility include “the potential of opportunities for interactions” (Hansen 1959) and “the ease with which any land-use activity can be reached from a location using a particular transport system” (Dalvi and Martin 1976). Accessibility can be defined as the effort or ease with which activities can be reached using the available public transportation system. Accessibility has been regarded a property of places showing how easily they can be accessed from other places, as well as a property of people indicating how easily they can reach a set of potential destinations.

B. Transit Accessibility:

Many factors contribute to transit accessibility, including reasonable proximity from the origin and the destination to the service; safe, pleasant, and comfortable walking pathways to transit facilities; and acceptable parking facilities for cars or bicycles, etc. In public transit planning, access to the service and accessibility provided by the service are two very important issues (Murray et al. 1998). Access is the ease with which people can reach the transit stop. Accessibility is the suitability of the transit system in helping people get to their destinations in a reasonable amount of time.

Of the many factors, walking distance to transit facilities is recognized as an important determinant of transit use. A quarter mile, approximately 400 m, is the commonly accepted distance for a people willing to walk to use transit (Demetsky and Lin 1982). Zhao, Li, and Chow (2002) found that transit use deteriorates exponentially with walking distance to transit stops. A decay function was developed to reflect the deteriorating trend in transit use with respect to walk distance. So, increasing suitable access to transit systems is seen as a means of attracting more people to the transit system.

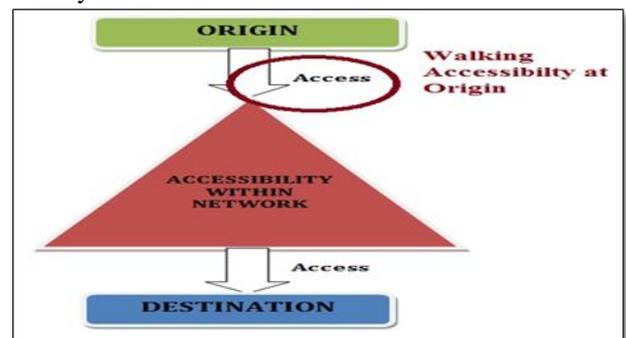


Fig. 1: Walking Accessibility at Origin and Destination (Source: Murray et al. 1998)

IV. STUDY AREA

Ahmedabad is the largest city and former capital of the western Indian state of Gujarat. It is the administrative headquarters of the Ahmedabad district and the seat of the Gujarat High court. With population of more than 5.8 million and an extended population of 6.3 million, it is the fifth- largest and seventh-largest metropolitan area of India. It is also ranked third in Forbes's list of fastest growing cities of the decade.

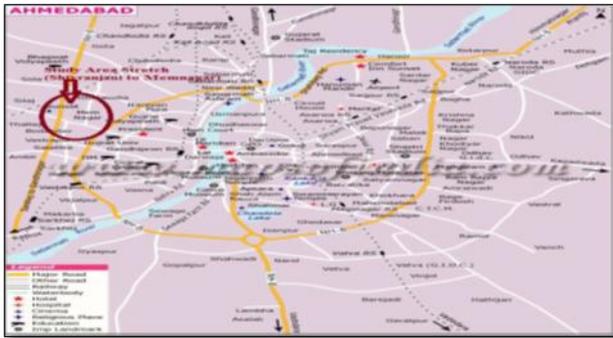


Fig. 2: Ahmedabad City Map
(Source: www.mapsofindia.com)

In Bus Rapid Transit System, Buses move in the dedicated lanes at high speed without the obstruction from vehicle crossing the lanes. BRTS-Ahmadabad also known as JANMARG is a bus rapid transit system in Ahmadabad, India. Technical procedures were started in 2006. A part of the first corridor connecting Pirana to RTO junction was opened to public in 2009. BRTS is operational on 18.7 km from RTO to Kankaria Lake.

RTO to Memnagar BRTS corridor is the one of the busiest passenger movement route of Ahmedabad City (As per operational manager, BRTS office, Usmanpura). So we have selected this route as a case study. We have visited this corridor for pilot study and there are five stops name as Ranip, Akhbarnagar, Shastrinagar, Jaymangal chowk and Memnagar on this corridor. Study area corridor is shown in Figure-3.

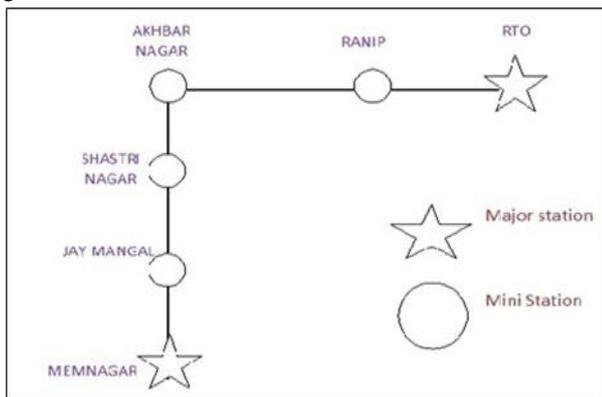


Fig. 3: Study Area Corridor (RTO to Memnagar)

V. FIELD STUDIES

A. General:

The important part of any research study is the collection of actual and reliable data. Sample collection and distribution should be in a manner that can meet the characteristics of each part of overall study area. The data has been collected at the bus stops and in the buses.

B. Bus-Stop/On board Survey:

We have visited at Ahmadabad city for the collecting the data of the BRTS. We have collected the data using the survey method as Bus stop survey and on board survey. In Bus stop survey, we have asked the questions to the persons who are using the BRTS every day. For On board survey, we have travelled by BRTS buses and interview to the person. For the question interview, appropriate questionnaire format was used which is prepared by us. The sample collection detail is given in Table- 1:

Sr. No.	Bus-stop	Sample
1	RTO	35
2	Akhbarnagar	19
3	Shastrinagar	12
4	Memnagar	36
	Total	102

Table 1: Sample Collection Details

C. Preference Survey:

Preference survey means the people want to use. People want to minimum time and minimum walking distance to reach the nearest bus-stop. We collect the 102 samples and present condition most of interviewers prefer the 5 min walking time and 300m walking distance to reach the nearest bus-stop.

VI. STUDY ANALYSIS AND DISCUSSION

A. Socio-Economic Characteristics:

1) Income Analysis:

The households of the study areas are categories in four groups as LIG, MIG, HIG, VHIG where L, M, H, V tends for Lower, Middle, Higher and Very Higher income levels. Nearly 65% of the household belong to middle income category and 3% of the household from VHIG. The analysis of income levels for the four categories is shown Figure- 4.

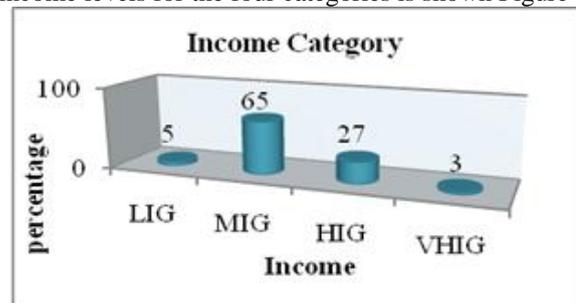


Fig. 4: Income Category

The vehicle ownership of the peoples is divided into three categories such as Car, 2W, Cycle for the present study. Nearly 65% of the peoples are using 2W and 17% of the peoples are using Car of the study area corridor.

2) Travel Analysis:

In this part, the trip purpose is mainly divided into the work and education. Nearly 82% of the people using BRTS for the work purpose and 18% of the people using for the education purpose. From the survey data, it has found that nearly 38% of the people using the RTO as origin and 12% of the people using the Shastrinagar as origin. Same as origin, nearly 28% of the people using the Memnagar as destination and 20% of the people using the Akhbarnagar as destination.

B. Walking Distance /Time and Preference Analysis:

1) Walking Time Accessibility to Bus-Stop (Min.) (WTA):

15% of the peoples from head have 5min. walking time to reach nearest bus stop, 38% have 10 min. and 25% have 30 min. The graphical representation of the walking time to reach the nearest bus stop has shown in Figure-5.

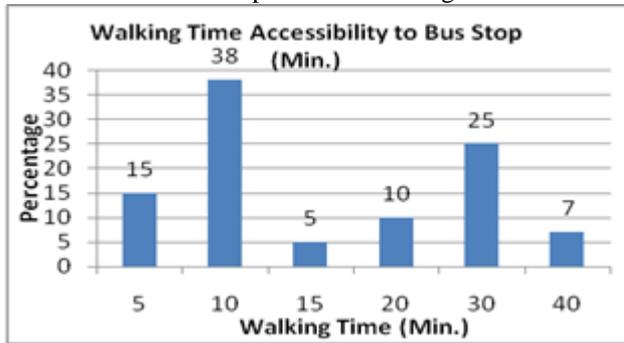


Fig. 5: Walking Time Accessibility to Bus-Stop

2) Walking Distance Accessibility to Bus-Stop (WDA):

This part is divided into four categories such as 200m-400m, 400m-600m, 600m-800m and 800m-1000m. 53% of the people involved in 200m-400m and 5% of the people involved in 400m-600m. Figure-6 shows the walking distance to bus stop.

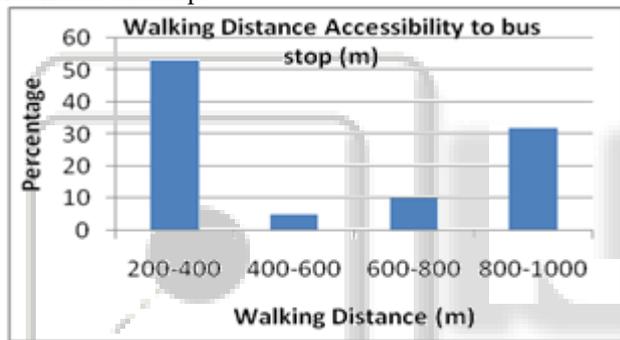


Fig. 6: Walking distance accessibility to Bus stop

3) Preferable walking Time:

77% people have told that their preferable walking time is 5min and 23% people have told that their preferable walking time is 10 min. Figure-7 shows the preferable walking distance (meter).

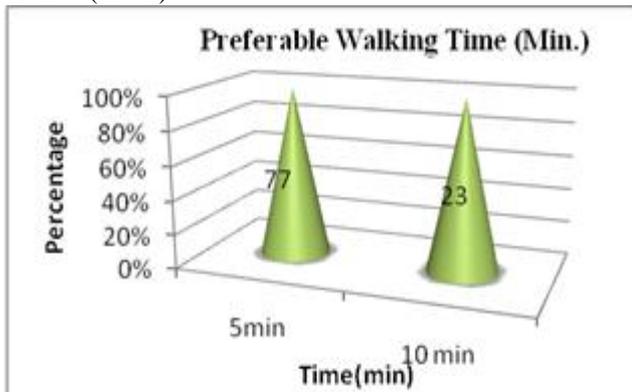


Fig. 7: Preferable walking time (min.)

4) Preferable walking Distance:

78% people have told that their preferable walking distance is 200m-300m and 22% people have told that their preferable walking distance is 300m-400m. Figure-8 shows the preferable walking distance (meter).

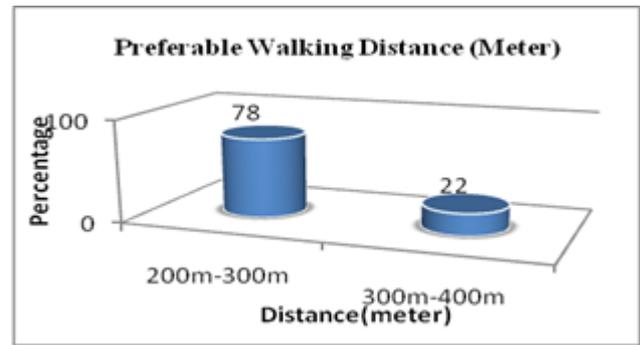


Fig. 8: Preferable walking distance (meter)

C. Summary Of The Analysis:

- The income analysis of the study area shows that 65% of the people are belongs to Middle Income Group. Present up time of the peoples is 7am to 9am in the morning and return time of the people is 4pm to 6pm.
- In Walking Time Accessibility (WTA) to bus-stop analysis, the maximum people say that their existing walking time is 10 min to reach the nearest bus-stop.
- In Analysis of Walking Distance Accessibility (WDA) to bus-stop, the maximum respondent says that their existing walking distance is 200m-400m to reach the nearest bus-stop.
- The preference analysis of walking time to reach the nearest bus-stop shows that most of people preferred 5 min walking time to reach the nearest bus-stop and most of people prefer the 200m walking distance to reach the nearest bus-stop.

VII. CONCLUSION

Public Transport is sustainable service in urban area. For that accessibility is a major component of any type of Public Transport. For present study, we have taken the one corridor name as RTO to Memnagar of Ahmedabad BRTS as a case study. The analysis such as walking time accessibility to Bus-Stop and Walking distance accessibility to Bus-Stop has been carried out and we have tried to know what is the passenger's preferable walking time and distance from the collected data using bus stop and on board survey. We have found that accessibility is very poor in existing condition but, if facility will improve than we can increase the ridership of BRTS from RTO to Memnagar corridor.

REFERENCES

- [1] Abley and Williams, (2008), Public Transport Accessibility Levels, IPENZ Transportation Conference.
- [2] Austroads Report AP-137 (1999), Assessment Techniques and Tools for Rural Accessibility.
- [3] Babbie 1999. Relocation of Faculty of Health and Food to Garthdee. Transport Impact Assessment for Robert Gordon University.
- [4] Barnes (2005) The Importance of Trip Destination in determining Transit Share, Journal of Public Transportation, Volume 8, No 2.
- [5] Cervero (1994), Rail Orientated Office Development in Caifornia, How successful? Transportation Quarterly, Vol 48.

- [6] Colin Buchanan and Partners 1996. Southern General Hospital. A Transport Strategy.
- [7] Cooper, S. 2003. Measuring public transport accessibility levels: Sub matter 5b parking strategy, transport for London.
- [8] Currie, G. 2004. Gap Analysis of Public Transport Needs: Measuring spatial distribution of public transport needs and identifying gaps in the quality of public transport provision. Transportation Research Record: Journal of Transportation Research Board 1895. Washington, DC: TRB, National Research Council, 137-146.
- [9] Dasguptas and Sharman 1994. Transport and Urban Change: Commuting Trends in 27 British Cities and Towns. Project Report PR/TR/023/94. Transport Research Laboratory.
- [10] Report 1064, Transport and Road Research Laboratory, Department of the Environmental, Department of Transport.

