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Research Article / Araştırma Makalesi

ACCESSIBILITY AUDIT OF BRT STATIONS FOR THE ELDERLY, THE DISABLED AND FOR CHILDREN

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ABSTRACT

Istanbul is amongst the first 20 cities in the world that were defined by UNESCO. 20% of the total population of Turkey lives in Istanbul. %25 of all economic activities in Turkey take place in Istanbul. Due to these economic activities and the high population mobility in the city is very high. According to the 2011 Transportation Master Plan of Istanbul 20 million trips were conducted in the Istanbul that year. Accessibility of places and services is very important for urbanization and for participation in community life. Benefitting from social equity in a community in terms of accessibility is a human right. Thus the rights of disadvantaged groups must be taken into consideration when considering transportation.

In this study the stations of BRT which is a very important public transport system in Istanbul will be examined in terms of accessibility. The aim of the study is to examine what should be done for disabled accessibility at BRT stations by using examples of accessible and inaccessible stations in the Istanbul BRT system. The second part of the study looks at accessibility at transfer stations. The stations chosen for the study are Edirnekapı station as a problematic station in terms of disabled accessibility, Beylikdüzü Belediye station as successful and Zeytinburnu station as a transfer center where BRT, tramway, and LRT intersect.

The aim of the study is to develop suggestions to improve disabled accessibility at BRT stations by examining examples of successful and unsuccessful stations.

Keywords: Disabled, accessibility, BRT.

1. INTRODUCTION

Istanbul is the biggest city in Turkey and one of the most important cities in the world. Total population of Istanbul is approximately 15 million. This means that 20% of the total population of Turkey live in Istanbul. 38% of total industrial areas of Turkey are located in Istanbul which makes the city an important economic activity center. The contribution of Istanbul to the total industrial employment of Turkey is 20%. Commercial activities have been an important issue for Istanbul for as long as the city existed. Today, due to its geographic advantages Istanbul has a very high commercial volume. Commercial activities make up 27% of all total commercial activities of Turkey. This economic liveliness has made Istanbul an attraction point. Especially after the 1950s the city experienced an important migration wave, and the population of the city increased rapidly. Today Istanbul is still dealing with migration related problems. Transportation

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is an important problem in Istanbul. Due to economic activities and its large population mobility in Istanbul is very high. The city has a linear urban development pattern which due to its geographic location and natural boundaries spreads on two continents . Due to linear macroform distances between the south and west edges of the city the travel distances are long. According to the 2011 Istanbul Transportation Plan 20 million trips were done daily in Istanbul that year.

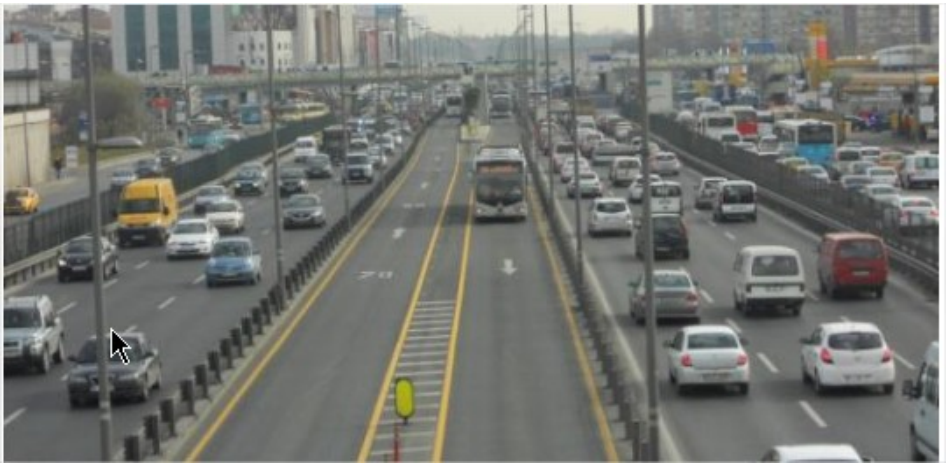

Figure 1. BRT system in Istanbul

In this study accessibility of BRT stations in Istanbul will be discussed. The BRT system has entered Istanbul's public transportation system in 2007 with 18,2 km route length and with 14 stations. Today the system serves with 52 km route length and 45 stations. One of the most important bottlenecks of Istanbul is the Bosporus crossing. The Bosporus divides the city into two parts, and until the 3rd phase of the BRT the city did not have an integrated transport network across the Bosphorus. As a rubber tired transportation mode the BRT crosses the bridge easily. Daily ridership of the system is more than that of many railway systems in Istanbul or inTurkey. The system carries 800.000 passengers/day.

The methodology of the study: in order to provide continuous journeys, the BRT stations are located at the center of the highway with access to the station platform provided via over and underpasses. In this study the stations will be examined with regard to accessibility equipment such as elevators, escalators and ramps. All stations will be reviewed from a wheelchair user's' perspective, because any station that is accessible by wheelchair users is accessible by everybody. Access to the over and underpasses can be provided by stairs, but according to the TS12576 Standard over and underpasses equipped only with stairs are regarded as inaccessible, as there should be not only stairs but also either a ramp or elevator for disabled access. Standards for this equipment are also defined in TS12576 and TS12460 with the aim of providing a safe and accessible journey for all users.

2. LITERATURE REVIEW

Many disabled people find traveling around very difficult or even impossible whether within their own neighborhood or long distances. This is because of restrictions to mobility in the environment and in transport services. Thanks to raised awareness of the rights of the disabled these restrictive barriers have been recognized. Unless and until they are removed a substantial

proportion of the population will continue to be disadvantaged and unable to travel individually and participate in society.

Being able to access places easily and without being dependent to other people is very important for life in an urban environment and for participation in community life. Social equity has to be provided for everyone in a city, and transportation is one of the most important public services and has to be accessible by all.

According to the Transit Research Program (TCRP) A-23 Report; BRT is a flexible, rubber tired transit mode combining stations, vehicles, services, running ways and ITS components into an integrated system with strong positive image and identity. In other words, BRT is a permanently integrated system of facilities, services and amenities which collectively increase the speed, reliability and identity of bus transit. BRT can be seen as a rubber-tired rail system which provides flexibility in operation and can be implemented with a smaller investment and lower operating cost.

According to Law Number 5378 enacted in 01.07.2005; all municipalities are responsible for providing an accessible transportation service for their residents. Transportation accessibility is defined by the United Nations as the legal right of everyone. The Road Safety Action Plan (2010-2020) published by the European Union highlights safe access for all users within a city.

There are very detailed standards for accessibility in the build environment in Turkey. According to the Turkish Statistical Institute (TSE) these standards are capable to create an accessible environment for all. The reason for inaccessible environments today is the control mechanism of the implementation.

In 2002 a survey was conducted on the disabled population in Turkey. According to this survey 12,29% of the total population of Turkey has disabilities. Approximately 8.5 million people experience difficulties in participating in community life in the built environment because of inappropriate layouts. 32% of participants in the survey claim that they cannot go outside the house due to physical obstacles, and 50% of them claim that they cannot use public transport because they experience difficulties accessing the stations and boarding the vehicles. When dealing with the accessibility issue it should not only be disabled people that are considered but also other people such as the elderly, people with chronic diseases, the temporary disabled, people with children and in the simplest terms people who are carrying heavy loads, etc. When all these people are considered any improvement to accessibility will make everyday life of the whole community easier.

3. BEYLİKDÜZÜ-SÖĞÜTLÜÇEŞME BRT ACCESSIBILITY AUDIT

The BRT system in Istanbul is located on the D-100 highway, one of the main arterials in the city. Since the system runs through the middle of the highway, access to the station platform is provided via over and underpasses. Thus, in order to be accessible to wheelchair user the stations have to be equipped with appropriate equipment - there has to be either a ramp or elevator for wheelchair users to access the platform. Although escalators make passenger access to platforms easier, they are not suitable for wheelchair users. The presence of only escalators does not make the station accessible. Thus accessibility will be discussed on the basis of whether there is a ramp or elevator present. However, the mere presence of an elevator is also not enough to make the station accessible, as it also has to be functioning and in good condition.

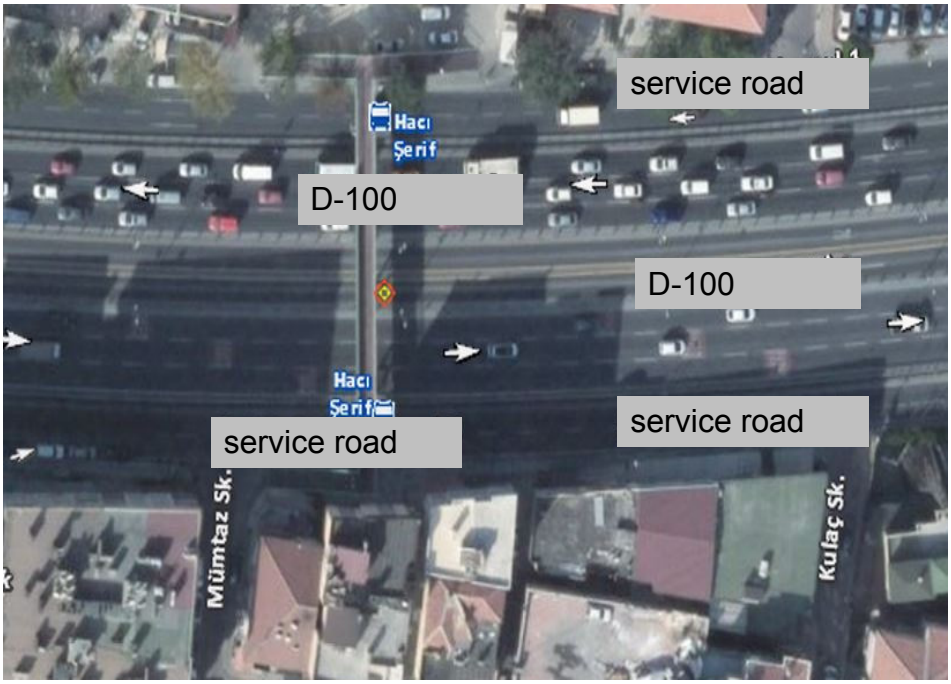

Figure 2. BRT Station configuration

The design of the stations is shown in Figure 1. In the middle of the highway there is a platform for boarding the bus. In order to reach the platform passengers have to use over and underpasses from the north or south service roads. There are three critical points to access the platform which will be discussed in more detail. Data gathered during field trips is shown in the figure 2.

	NORTH			SOUTH			PLATFORM		
	Elevator	Escalator	Ramp	Elevator	Escalator	Ramp	Elevator	Escalator	Ramp
STATIONS									
Tüyap end station			X			X	AT GRADE		
Tüyap end station 2		X	X		X	X	AT GRADE		
Hadımköy			X			X			X
Cumhuriyet Mahallesi			X			X			X
Beylikdüzü Belediye	AT GRADE			AT GRADE			X	X	
Beylikdüzü			X			X			X
Güzelyurt		X	X		X	X		X	X
Haramidere			X			X			X
Haramidere Sanayi			X			X			X
Saadetdere Mahallesi		X	X		X	X		X	X
Mustafa Kemal Paşa			X			X			X
Cihangir Üniversite Mahallesi			X			X			X
Avcılar Merkez			X			X			X
Avcılar Merkez 2			X		X	X			X
Şükrübey	X	X		X	X	X	X	X	X
Şükrübey 2		X	X		X	X	X	X	
İBB Sosyal Tesisler		X	X		X	X	X	X	
Küçükçekmece	X	X	X	X	X	X	X	X	X
Cennet Mahallesi		X	X			X	X		X
Florya	X	X	X	X	X	X	X	X	
Florya 2		X	X	X	X		X	X	
Beşyol	X	X			X			X	X
Sefaköy	X	X	X	X	X	X	X	X	X
Sefaköy 2	X	X	X	X	X	X	X	X	X
Yenibosna	X	X		X	X		X	X	
Şirinevler	X	X	X	X		X	X	X	X
Şirinevler 2	X	X	X	X	X	X	X	X	X
Bahçelievler		X	X		X	X		X	X
İncirli	X	X			X		X	X	
Zeytinburnu	X	X		X	X		X	X	
Merter	X	X	X	X	X	X	X	X	X
Cevizlibağ		X	X		X	X		X	X
Topkapı	X	X		X	X		X	X	
Bayrampaşa-Maltepe	AT GRADE			AT GRADE			X	X	X
Edirnekapı	AT GRADE			AT GRADE				X	X
Ayvansaray	X	X	X	X	X	X	X	X	X
Halıcıoğlu	AT GRADE			AT GRADE			X	X	X
Halıcıoğlu 2		X	X	AT GRADE				X	X
Okmeydanı	X	X			X		X	X	
Okmeydanı 2	X	X	X	X	X	X	X	X	X
Darülacize Perpa	AT GRADE						X	X	
Okmeydanı Hastane	X	X	X	X	X	X	X	X	X
Çağlayan		X	X		X	X		X	X
Mecidiyeköy	X	X	X	X	X	X	X	X	X
Mecidiyeköy 2	AT GRADE			AT GRADE					X
Zincirlikuyu			X			X	AT GRADE		
Boğaziçi Köprüsü	X	X	X	X	X	X	AT GRADE		
Burhaniye	X	X	X	X	X	X	X	X	X
Altunizade	X	X	X	X	X	X	X	X	X
Acıbadem	AT GRADE			AT GRADE			X	X	X
Uzunçayır	AT GRADE			AT GRADE			X	X	X
Fikirtepe	AT GRADE			AT GRADE			X	X	X
Söğütlüçeşme	AT GRADE			AT GRADE			AT GRADE		

There is equpment
There is no equpment

Figure 3. Status of Means of Access (on a Station Basis

	NORTH			SOUTH			PLATFORM		
	Elevator	Escalator	Ramp	Elevator	Escalator	Ramp	Elevator	Escalator	Ramp
STATIONS									
Küçükçekmece	X	X	X	X	X	X	X	X	X
Sefaköy	X	X	X	X	X	X	X	X	X
Merter	X	X	X	X	X	X	X	X	X
Bayrampaşa-Maltepe	AT GRADE			AT GRADE			X	X	X
Okmeydanı Hastane	X	X	X	X	X	X	X	X	X
Boğaziçi Köprüsü	X	X	X	X	X	X	AT GRADE		
Burhaniye	X	X	X	X	X	X	X	X	X
Altunizade	X	X	X	X	X	X	X	X	X
Acıbadem	AT GRADE			AT GRADE			X	X	X
Uzunçayır	AT GRADE			AT GRADE			X	X	X
Fikirtepe	AT GRADE			AT GRADE			X	X	X

There is equpment
There is no equpment

Figure 4. Inaccessible stations

According to the study, in order to be accessible a stations must have an elevator or ramp at all three critical points (service road north, service road south and platform). If one of the critical points is not accessible, the station is regarded as not accessible.

In order to be accessible for all, a station must have an elevator or ramp at all three critical points. But having elevators does not mean that the station is accessible, because elevators need to be maintained periodically, otherwise they do not function reliably. Also elevators should be located at an accessible point of the station. There should be no obstacle on the path to the elevator. Thus it is always advantageous to have ramps at stations. They can serve users under any weather condition with little and infrequent need for maintenance.

Figure 5. Examples for Ramps from Stations

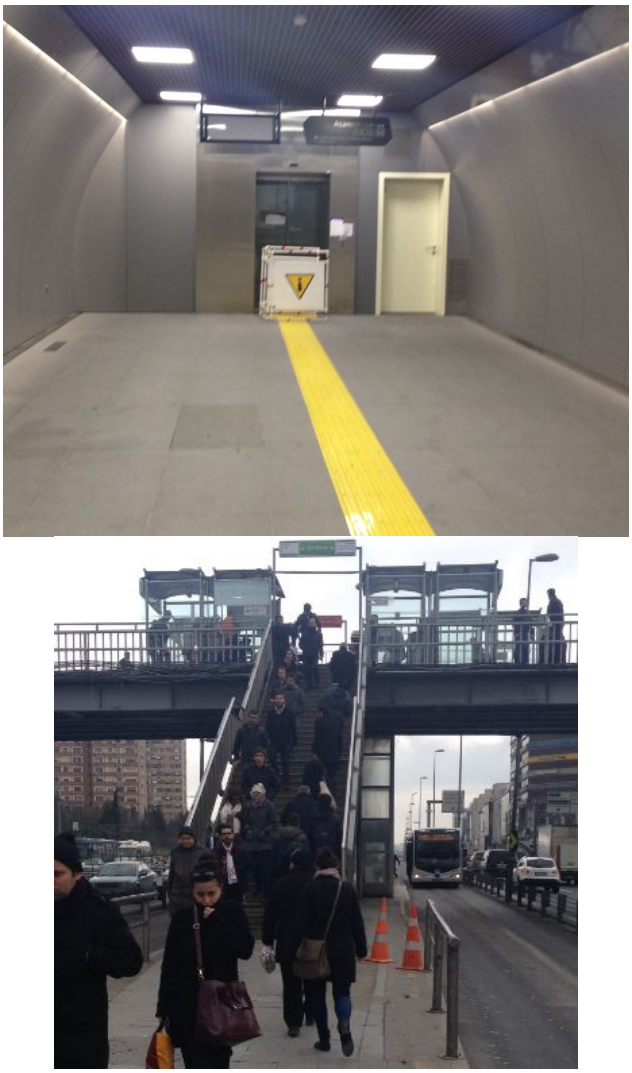

Figure 6. Broken and inaccessible elevators

In this study Edirnekapı Station is examined as the most problematic station with regard to accessibility. What makes this station different from others is the height of the overpass. Also there is only one elevator at the platform which does not meet the demand. There is no escalator. It is very difficult for any person to climb up the stairs even if the person has no disability. During the field survey it was observed that the station was very crowded even during off-peak hours. Thus accessibility improvements should be done at this station immediately.

Figure 7. Accessibility Difficulties at Edirnekapı Station

Zeytinburnu station is one of the most important transfer centers on the European side. Many different transport modes intersect here, including BRT, LRT, tram and minibus stations, İETT bus stations and the 'Park and Ride' facility. Thus all these modes should be integrated carefully. During this study it was observed that Zeytinburnu station has good integration with LRT, tram, İETT buses, minibuses and Park and Ride. Using ramps as a means of integration has provided continuous accessibility between different modes.

Figure 8. Zeytinburnu station, Access ramp from platform to overpass .

Figure 9. Access ramp to south service road and integration with İETT bus station.

Figure 10. BRT's integration with minibuses is provided via elevators

Figure 11. BRT's integration with tramway is provided via elevators

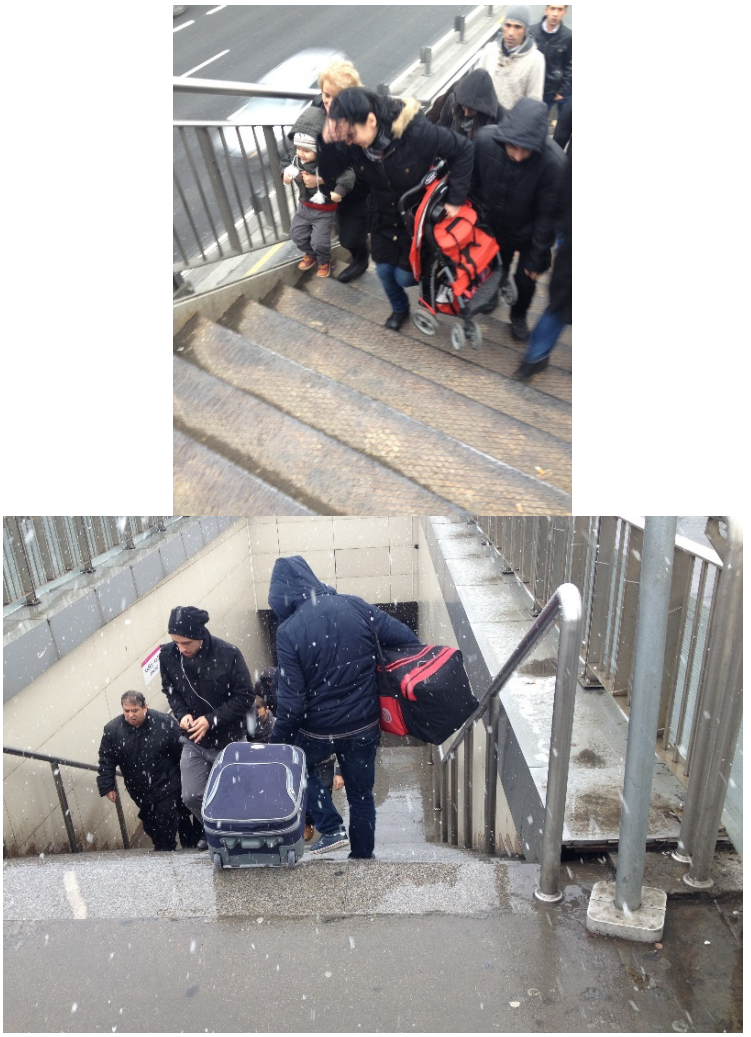

Figure 12. A mother traveling with her child and a man carrying suitcases

4. CONCLUSION

Detailed examination revealed that the BRT stations of the 'first three phases' are built with stairs only. Due to social equity concerns and the new law that came into force in 2005 making it compulsory for local administrations to make public services accessible to all, the fourth phase of the system was constructed with more accessible stations. In order to make stations more accessible elevators and escalators were added to the three critical points of the stations.

This study shows that 13 out of 44 stations are inaccessible. 30% of stations are inaccessible in a system that carries approximately 800.000 passengers/day. There are 53 over and underpasses in the system and 20 of these do not meet accessibility standards. BRT is one of the most important public transport services in Istanbul and it has to be accessible to all in order to ensure social equity among passengers. The local authority responsible for the BRT operation has to pay

more attention to accessibility issues and improve the quality of service in order to provide the community with a world class public transport system.

Not only the BRT stations but all public transport stations have to be accessible by all, especially systems with under or overpasses like metro, tramway LRT etc.

The presence of escalators and elevators makes stations seemingly accessible but if these are not functioning properly they do not make the station accessible. Thus it is always better to have ramps at stations. Since they do not have mechanical components they need only occasional maintenance. There are no disruptions to accessibility as can be the case with broken-down elevators and escalators.

Due to raised awareness with regard to disabled accessibility in public transportation in Turkey, the BRT stations are being improved with accessibility equipment. These improvements should be audited in frequent intervals as subject of a future study.

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