

Available online at www.sciencedirect.com**SciVerse ScienceDirect**

Procedia - Social and Behavioral Sciences 35 (2012) 89 – 96

Procedia
Social and Behavioral Sciences

AicE-Bs 2011 Famagusta

Asia Pacific International Conference on Environment-Behaviour Studies, Salamis Bay
Conti Resort Hotel, Famagusta, North Cyprus, 7-9 December 2011

Accessibility for Disabled in Public Transportation Terminal

Seyed Hassan Khalifeh Soltani^a, Mashita Sham^b, Mohamad Awang^b & Rostam
Yaman^{b*}^a Center for Environment-Behaviour Studies, Faculty of Architecture Planning and Surveying, UiTM Shah Alam, Malaysia^b Faculty of Architecture Planning and Surveying, UiTM Shah Alam, Malaysia

Abstract

Accessibility is important in daily life especially when dealing with external and internal environment. Realizing that most public transport terminals still lack in terms of good design and facilities thus a serious concern for the matters is needed to ensure the convenient for all. It has been widely accepted that disabled people, have fewer opportunities and lower quality of life than non-disabled. Added with poor accessibility, the disabled people face more challenges and difficulties while travelling and using the public transport. Therefore, it becomes increasingly difficult to ignore the disabled issues while using the facilities of the public transport.

© 2012 Published by Elsevier B.V. Selection and/or peer-review under responsibility of Centre for Environment-Behaviour Studies(cE-Bs), Faculty of Architecture, Planning & Surveying, Universiti Teknologi MARA, Malaysia
Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Keywords: Accessibility; disabled; public spaces; transportation terminal

1. Introduction

“Accessibility is about giving equal access to everyone and without being able to access the facilities and services, persons with disabilities will never be fully included” United Nations (2007).

The inefficiency of accessibility in public transport terminal has led towards inconvenienced and prohibits many disabled from moving around freely. According to Henry (2009), inaccessibility to the

* Corresponding author. Tel.: +60126438603; fax: +60380110427.
E-mail address: hassan_kh8@yahoo.com.

built physical environment is one of the significant barriers to the full participation of persons with disabilities in the society. Griffin (2000) further added that the simplest way of increasing the use of public transportation facilities is to establish an environment where pedestrian access is safe, convenient, and comfortable.

Progress has been made to identify the factors affecting disabled accessibility to the public transportation terminals, because disabled are considered as a group of people who would face the difficulty of accessibility to the environment. Haber and Blank (1992) revealed that the present provisions are inadequate and not disabled friendly. They also highlighted that there is an increasing awareness, particularly in the industrialized countries, pertaining to the disabled.

Kennedy and Hesla (2008) supported that people with disabilities have not been treated as equals. They pointed that, the disabled is unique and have a limitation in accessibility in use of built environment needs further attention in a society as compared to a normal people. According to little research that has been directed towards the open environment and discovering the disabled accessibility in public transportation terminals. Therefore, the intention of this research is to consider the design of infrastructure for disabled especially when transport terminal is concern. This is to make the environments more responsive to individuals and groups with lower level of environmental competence and to ensure that all people can access to public transport terminal buildings.

The aim of the research seeks to demonstrate the impact of current legislation and standards design for disabled concerning the accessibility aspect of public transportation terminals. Specifically, the objectives of the research are as follows:

- To identify and highlight accessibility in approaching, the spaces in the transport terminals.
- To evaluate the interior infrastructure that affects disabled accessibilities in the transport terminals.
- To suggest recommendations for the improvement of the accessibility in the terminals for disabled.

In this study, the definition of disabled would be adopted from Code on Accessibility in The Built Environment, by Harisson (2007) who stated that the disabled are those people who has a consequence of physical disability or impairment. In relation to the physical environment, disabled people may be divided into: Ambulant disabled, Wheelchair-bound, Sensory disabled and Temporary disabled.

2. Literature review

Accessibility is increasingly recognized as a key element of a high quality, efficient and sustainable transport system. Indeed all of us as users of the transport system benefit from easier access to buses, trams, trains, planes and ships (Cullen, 2006).

In reviewing accessibility for the disabled in public transport terminals, there are several factors that need to be taken into account to get the correct picture of the journey cycle. It is important to consider the of journey cycle for a better understanding and experience the whole journey of accessibility for disabled. It also helps to know the problems faced by a person with disabilities (PWDs). Figure 1 below show the journey cycle standard for disabled people. Based on the breakdown above, this study examine the external environment to and from the terminal, buying ticket(s), finding the correct service, waiting at the terminal, getting on and off from the transport mode and getting to the desired destination.

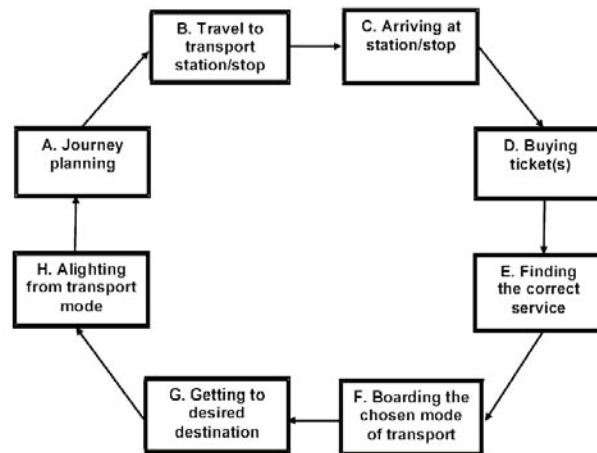


Fig. 1: The Journey Cycle. (Source: Assessment of Accessibility Standards for Disabled People in Land Based Public Transport Vehicles, Lafratta, 2008).

2.1. External environment

In 2000, Cowan reported that well designed public spaces are functioning parts of a network of pedestrian routes, providing for the needs of all users including disabled and elderly people. Bezzina and Spiteri (2005) described that, in designing buildings it is important that everybody including persons with a disability is able to access and use the internal and external facilities associated with the development building or facilities. In 2006, Smith conclude that, a good means of access would be a route that does not incorporate obstacles and hazards, and it is not problematic to people, including those who have impaired sights, impaired mobility use walking aids or use wheelchair.

Lacey (2004) highlighted that cars are the only practical method of transport for some disabled people, and accessible parking is therefore, an important consideration. As being defined by Bezzina and Spiteri (2005), car parking and setting down are important activities at the beginning or the end of journeys.

Sawyer and Bright (2007), discussed that the provision of appropriately designed, constructed and managed ramps is of importance to all users, but especially those using wheelchairs, pushing buggies or trolleys, and people using walking frames.

At least one accessible route shall be provided within the site from accessible parking spaces and accessible passenger loading zones; public streets and sidewalks; and public transportation stop to the accessible building or facility entrance they serve, (ADA, 2004). Cullen (2006) pointed that, for people who are blind or who have little residual vision, tactile surfaces are essential for the safe progress through the street environment. Henry in (2009), noted that by providing ramps, suitable toilets and handrails its can help to achieve accessibility to persons with disabilities; Infrastructure for pedestrians needs to provide routes that are direct, continuous, safe, convenient and attractive. Paths and sidewalks should be comprehensive and provide for the journeys that people want to make including routes through residential areas (Malhotra, 2010).

2.2. Internal environment

Early study was done by Griffin, 2000 who conducted a study on transit facilities pointed that entrances must be fully accessible and provide convenient access for passengers and fit appropriately

within the surrounding urban context and community. In 2004, Lacey agreed that a new buildings principal entrance (or entrances) should be accessible.

Disabled and elderly find that standing for any length of time uncomfortable or even impossible, so providing seating at appropriate points throughout the terminal is very important. It is worth remembering that some of the distances people have to negotiate within a terminal are considerable (Cullen, 2006). Sawyer and Bright 2007 stressed that the provision of accessible toilet facilities in the building is important. At least one toilet should be provided at each location for the wheelchair user. It may determine whether the building is truly accessible for a disabled. In 2010, Malhotra who conduct a practice in accessible public transport highlighted that priority seats for disabled in the vehicle should be close to both the driver and to the entrance/exit, to ease communication with the driver and to minimise the distance walked in to the public bus.

3. Methodology

Research design refers to the actual plan for the collection and analysis of data (Shamsuri, 2005). According to Remenyi, William, Money, & Swartz (1998), discussed that there are many factors that can be considered when choosing an appropriate research methodology. The selection of research method depends on the topic and the specific research question. They further added that a qualitative approach is more appropriate when the researcher is trying to understand and explain a phenomenon rather than search for external causes. In addition, Salkind (2003) stressed that qualitative research is more preferable research to choose because there were no statistical analyses involved. However, in contrast quantification often makes the observation more explicit and in the other words, the presence of numbers makes it easier for readers to understand and to interpret facts, because numbers are countable (Shamsuri, 2004). Therefore, this study proceeds with a quantitative approach.

This research started by first defining the population of the study. The main target population in this study consists of the disabled commuters especially at KL Central and Klang Central Station. In total, only disabled commuters with the aged between 18 years and above who, depend on public transport to connect within Klang Valley were considered in the survey. From there, a sample size was determined using a statistical formulation of appropriate sample size. At the same time, an instrument in the form of the questionnaire was design to gather the required information on perception towards the accessibility of the public transportation terminals.

The analysis of the questionnaires was done separately among the two case study areas. The total sample size needed for the study is 30 questionnaires. It was prepared to represent a case study in both KL Central and Klang Central Station area. The first 15 respondents were chosen as a sample size of Kuala Lumpur area while the last half dedicated to reflecting in the area of Selangor. After completing the data collection, results were then compiled for the purposed of data editing, cleaning as well as data coding. Data processing and analysis were done using a Statistical Package for Social Science (SPSS). Data analysis of information gathered from the questionnaire in the form of tables. The statistical analysis was utilized to study the relationship between infrastructure designs, principle of universal design towards disabled accessibility.

4. Result and discussion

It is observed from Table 1 that, the absolute quantities of female commuters are generally higher than male commuters in both areas. Female commuters formed almost $\frac{3}{4}$ of the total number is obviously dominating the usage of public transportation compared to only 27% by male commuters. The data indicated citizen with an age range from 56-64 years old out number all other group of ages in this survey

with 30%. Senior respondents with aged beyond 65 years old ranks at the second spot with 20%. The rest four groups of age bring the total sum of the remaining 49% of respondent.

Table 1. Mean score for demographic pattern.

Demographic Pattern	Percentage (%)
Gender	
Male	27
Female	73
Age	
28 and Below	13
29-37	13
38-46	13
47-55	10
56-64	30
65 and Above	20

As depicted in Table 2 below, the result indicated according to the friendliness factor of disable facilities provided at the public transportation terminals. Platforms gather the lowest rate among all infrastructures followed by ramps, steps and walkways. These basic infrastructures were poorly designed for disable commuters in both case study areas. However, waiting at spots, toilet and escalator are quite friendly and were rated better by the disabled people. Common infrastructures as listed before are generally served better for both non-disabled and disabled people.

Table 2. Mean score for current infrastructure provision.

Infrastructure	Mean Score (1-7)
	1-Very dissatisfied 7- Very satisfied
Parking	3.73
Steps	3.43
Ramps	3.20
Walkway	3.67
Tactile	3.90
Entrance	4.27
Waiting	4.63
Toilet	4.60
Signage	3.87
Escalator	4.30
Lifts	4.07
Platform	2.47

In order to get the better understanding of accessibility for disabled, the questionnaire for level of safety were formulated to highlight the important of the journey cycle among the public transport

commuters. Table 3 provides the feeling of safe for the breakdown of the journey cycle. These were emphasized as follows to determine the satisfaction level towards the current facilities provided.

Table 3. Mean score for level of safety indication on journey cycle.

Travel Component	Mean Score (1-7)*
	1-Very unsafe 7- Very safe
Walking to and from terminal	3.00
Buying Ticket	3.90
Finding the correct service	3.77
Boarding to the chosen public transport mode	2.03
In Vehicle	3.53
Audio system in vehicle	3.50
Alighting from transport mode	2.03

Based on the data gathered in Table 4 above, it is shown that most of the commuter feels unsafe with the current infrastructure. This refers to the objective no. 1 which is to identify and highlight accessibility in approaching, the spaces in the transport terminals. The researcher found that walking to and from the terminal, boarding and alight from the chosen public transport is the most critical part that needs to give attention in this study. An implication of this result is the possibility that disabled who indicated a higher level of dissatisfaction towards the facilities provided tend to show a higher level of unsafe while using the facilities. Hence the design of physical environments involving the disabled should be an emphasis in a building. Therefore, it has been increasingly important to acknowledge their needs especially when accessibility to public transport is concern.

Table 5. Percentage of respondents.

Disabled criteria	Percentage (%)
Ambulant Disabled	50
Wheelchair-Bound	5
Sensory Disabled	35
Temporary Disabled	10

Refer to Table 5, it can be concluded that ambulant disabled who refers to elderly respondent contribute half of the survey which is 50% from the total respondents. Those who suffer from sensory disabled including visually & hearing impaired recorded the second highest percentage of 35%. Temporary disabled respondent including those who are sick or victims of an accident also pregnant woman influenced this survey with 10% while the remaining respondents come from wheelchair-bound group of disabled people.

5. Conclusion

Many studies have focused on the disabilities study. However, less research has been devoted to the specific area such as public transport terminals. Public transport serves as linkage and it helps the

communities to commute in daily activity, especially for those with low income. Refer to Table 2 result, elderly whose most of them are pensioners were the highest disabled public transport commuters in these two areas while wheelchair-bound disabled people still believe that there are a lot of improvements that can be done to accommodate their needs in the current facilities. Result shows that a significant amount of efforts by the government bodies is needed and huge demand of re-designing the current facilities, so that the disabled community would feel better accepted in the society and furthermore increased their equality and accessibility among the community in Malaysia.

This research would significantly promote and enhance the public buildings for better value by focusing on the disabled friendly facilities and design, thus promote the friendliness atmosphere of the public transport terminals for better usage and accessibility. The main contribution in this research is to foster a better relationship between a person with disabilities and normal citizens. In order implement a successful design for the physical environment, this study suggested that local authority should play an important role to established the ground and set the standard rules for designing the public facilities so that everybody can get an equal accessibility. Clearly, design is a major contributor to the accessible building that will automatically exclude some people from using it. In Malaysia, the level of public transportation awareness on the issues of disabilities is still lacking behind others countries. It is also can increase awareness among designers and architects to respect designing for accessibility. This is because the most important aspect of the study is to avoid poor planning, poor decision making especially during the initial stage of infrastructure design for the public transport terminals. Lastly, it is important for this conference to know in depth the importance of accessibility in the physical environment especially for a person with disabilities.

Acknowledgements

Many people have been of great assistance to me while I was pursuing this research. Special thanks go to UiTM for giving me this opportunity. I am appreciative of the invaluable input, encouragement and support throughout the process provided to me by my lecturer Prof. Dr. Hj. Mohamad Awang. A many thanks also goes to the Chair, AcE-Bs 2011 Famagusta Dr. Mohamed Yusoff Abbas who always has been a motivating force that helped to improve my research, and writing.

My acknowledgement also goes to the client and those who give information and participation in this study. I would like to extend my gratitude thanks to Syarikat Prasarana Berhad (Rapid KL) for their support in the transport related field and being part of the process in my research. Last but not least, No thesis or educational foundation would be completed without the time commitment and support from family and friends in making this research successful.

References

- Americans with Disabilities Act and Architectural Barriers Act (2004); Accessibility Guidelines. Accessibility Guidelines: Washington, D.C.
- Bednar, M. J. (1977). Barrier-Free Environments, Stroudsburg, Pennsylvania: Dowden, Hutchinson & Ross, Inc.
- Bezzina, F. and J. Spiteri (2005). Access for All; Design Guidelines National Commission Persons with Disability.
- Cowan, R. (2000). Urban Design in The Planning System; Towards Better Practice.
- Cullen, M. (2006). Improving Transport Accessibility for All; Guide to Good Practice, France: OECD Publications
- Goldsmith, S. (2000). Universal Design; A Manual of Practical Guidance for Architects, Architectural Press.
- Griffin, K. W. (2000). Building type basic for Transit Facilities.
- Habert, G. and T. Blank (1992). Building Design for Handicapped and Aged Person. United States: McGraw-Hill, inc.

- Harber, L., R. Mace, et al. (1993). *UFAS Retrofit Guide: Accessible Modifications for Existing Building*, New York: Van Nostrand Reinhold.
- Harrison, J. D. (2007). *Code on Assessability in The Built Environment*. B. C. Authority.
- Henry, T. (2009). *Policy On Persons with Disabilities*, Office of the Prime Minister (Social Services Delivery).
- Imre, R. and P. Hall (2001). *Inclusive Design; Designing and Developing Accessible Environments*, London & New York
- Kennedy, M. K. and B. Hesla (2008). *We Have Human Rights*. Harvard Project on Disability. Harvard.
- Lacey, A. (2004). *Designing for Accessibility, an essential guide for public buildings* Centre for Accessible Environments.
- Lafraffa, A. (2008). *Assessment of Accessibility Standards for Disabled People in Land Based Public Transport Vehicle*, United Kingdom: Department for Transport.
- Malhotra, K. (2010). *Accessibility and Universal Design; Implications for Public Transport and the Built Environment*. United Nations Development Programme, Kuala Lumpur.
- Matthews, B. and S. D. Gleave (2001). *The Disability discrimination Act and Developments Accessible Public Transport in the UK*. Molde, Norway: THREDBO7.
- United Nations, (2007). *Accessibility; A guiding principle of the Convention*.