



Applicability of Malaysian Standards and Universal Design in Public Buildings in Putrajaya

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Abstract

This paper discusses an on-going research on universal design implementation in public buildings in Putrajaya with the applicability to Malaysian Standards of accessibility. The areas of study include disability and accessibility issues, current accessibility system in Malaysia, Malaysian Standards and universal design implementation in built environment, and the importance of public buildings in Putrajaya. Site observation involving facilities measurement and photographic documentation was conducted in five significant public buildings in this city. The findings of this study may be used as reference to designers and building managements in providing adequate accessible facilities for the buildings' visitors.

Keywords: persons with disabilities, Malaysian Standards of accessibility, barrier-free/universal design

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1.0 Introduction

Accessibility in built environment has been a significant issue discussed by architecture researchers as well as disability scholars around the world. Many studies stress on the vulnerability of inaccessible environment to the disabled people which highlights the importance of barrier-free environment in today's world (Carr, Francis, Rixlin and Stone, 1992; Zola, 1993; Chapiro and Colvez, 1998; Antonak and Livneh, 2000; Haq, 2003; Putnam, Greenen, Powers, Saxton, Finney and Dautel, 2003; Metts, 2004). Numerous studies which assess the design for less-able group in architecture have also been conducted in many countries including Malaysia (Blanck, Schur, Kruse, Schwochan and Song, 2003; Darcy and Harris 2003; Kozey and Das, 2004; Thapar, Warner, Drainoni, Williams, Ditchfield, Wierbicky and Nesathurai, 2004; Wiman and Sandhu, 2004; Head and Baker, 2005; Abdul Rahim, 2006; Saito, 2006; Rashid, Hussain and Yusuff, 2008; Abd Shukor and Othman, 2010; Jamaludin, Mohd Ali and Mohamad, 2010). These studies have contributed to the improvement of global accessibility system in developed countries as well as developing countries.

Malaysia has also shown some developments in catering the need of persons with disabilities (PWD). Nevertheless, as appealed by Kamal Malhotra, the United Nations Resident Coordinator, in the National Conference on "Accessibility and Universal Design: Implications for Public Transport and the Built Environment", yet, there are the need to efficiently implement universal design in Malaysia, the need for more professionals or researchers in this area, and the need to revisit the current standards codes (Malhotra, 2010). Thus, this study is called to enhance and complement the precedent studies that have been done on Malaysian accessibility issues and universal design implementation in public buildings.

The present study assessed the design of accessibility in five significant public buildings of different functions in Putrajaya, using design requirements from the current Malaysian Standards for accessibility; MS 1184: 2002 Code of Practice on Access for Disabled People to Public Buildings, and MS 1331:1993 Code of Practice on Access for Disabled People Outside Buildings; as well as universal design principles. The purpose was to identify whether the accessibility facilities in those public buildings meet the design requirements and guidelines of current Malaysian Standards and universal design principles.

2.0 Literature Review

2.1 Disability and Accessibility Issues

Based on the International Classification of Functioning, Disability and Health (ICF), World Health Organization (WHO) defines disability as "the outcome or result of a complex relationship between an individual's health condition and personal factors, and the external factors that represent the circumstances in which the individual lives" (2010). The ICF adopt social model in addition to the medical model into its disability components, as illustrated in Table 1.

Table 1: Overview of the ICF Components

	Body Function and Structures	Activities	Participation	Contextual Factors
Level of Functioning	Body Function <i>Body (body parts)</i>	Individual (<i>person as a whole</i>)	Society (<i>life situations</i>)	Environmental Factors (<i>external influence on functioning</i>) + Personal Factors (<i>internal influence on functioning</i>)
Characteristics	Body function Body structure	Performance of individual's activities	Involvement in life situations	Features of the physical, social, and attitudinal world + Attributes of the person
Positive Aspects (Functioning)	Functional and structural integrity	Activity	Participation	Facilitators
Negative Aspects (Disability)	Impairment	Activity limitation	Participation restriction	Barriers / hindrances

(Source: WHO, 1999)

Social model views the exclusion of disabled people from the mainstream as the result of public stereotype and ignorance of their rights and capabilities (Antonak and Livneh, 2000; Meyers, Anderson, Miller, Shipp and Hoenig, 2002; Putnam et al, 2003; Wiman and Sandhu, 2004), inadequate employment opportunity (Jenaro, Mank, Bottomley, Doose, & Tuckerman, 2002), ignorance in the policy making system (Bickenbach *et al.*, 1999; Metts, 2004), and the physical barriers they encounter in built environment (Wiman and Sandhu, 2004). In short, disability is caused by the complex relations between human and the environment, which consist of the various elements of surrounding culture, society, politic, climate, topography, technology and architecture (Meyers *et al.*, 2002). From the social model, it is evident that barrier in architecture is one of the significant factors that contribute to disability situation of persons with impairments. Equally important, Imrie and Hall (2001) argue that policies, practices, and values of professionals who create the built environment are the main contributors to the barriers in architecture.

2.2 Current Accessibility System in Malaysia

Malaysian current disability and accessibility system has shown many improvements since last decades, namely by newly enacted regulations. On November 2001 for instance, the Ministry of Human Resources has established the Code of Practice of Employment of Disabled Person in Private Sector to increase job opportunities for PWD (Baharin, 2008). Malaysia has

also established the first right-based legislation for people with disabilities, entitled Persons with Disabilities Act in 2008 (Abd Shukor and Othman, 2010). With the enforcement of this Act, government wishes to provide PWD with better public transport facility, amenities and services, better health, education, information and technology, habilitation and rehabilitation, employment opportunities, as well as improved access to sports, leisure and cultural life activities.

Nonetheless, even with the growing numbers of accessibility regulations passed in this nation, the number of existing public buildings that have done modifications as approved by the standards codes is very few (Chen *et al.*, 2007). In addition, some of the modifications are not correctly built according to the codes; therefore they are risky to the users. For examples, the disabled toilet doors that are supposed to open to the outside are mistakenly installed the other way around, and ramps are built too steep (Mahyuni, 2008). Other than the weak law enforcement and negative public response, Malaysian accessibility system also needs to be refined due to the increasing number of registered PWD in Malaysia. According to the Department of Social Welfare (2010), the registered persons with disability in Malaysia have increased from 197,517 persons in 2006 to 248,858 person in 2008. The number is expected to increase over time, thus, it is crucial to form a more efficient accessibility system in Malaysia.

2.3 Malaysian Standards and Universal Design Implementation in Built Environment

The evaluation instruments of this research include Malaysian Standards for accessibility and universal design. To date, there are three current accessible design standards in Malaysia; MS 1184: 2002 Code of Practice on Access for Disabled Persons to Public Building (First Revision); MS 1331: 2003 Code of Practice for Access of Disabled Persons Outside Buildings (First Revision); and MS 1183: 1990 Specification for Fire Precautions in the Design and Construction of Buildings Part 8: Code of Practice for Means of Escape for Disabled People. Standards provide approved guidelines for the design of accessible facilities and detailed specifications that are too intricate to be included in codes regulations.

In addition to Malaysian Standards, universal design is also used as an evaluation instruments of this research because it covers broader range of users. College of Design, North Carolina University (1997) defines Universal Design as the design of products and environment which is usable by all people, to the greatest extent possible, without specialized design for certain group of people. The universal design's objective is to not demystify people's impairment, but rather to avoid such attention to their impairments and minimize public tendency to 'social ostracism' (Imrie and Hall, 2001). It is essential to adapt universal design principles in Malaysian accessibility system so that this nation is in line with other developed countries which provide accessible technologies that efficiently cater the need of all range of users. The seven principles of universal design are described in Table 3 below:

Table 2: The Key Principles of Universal Design

Principle	Description
Equitable Use	able to people with diverse abilities.

Flexibility in Use	The design accommodates a wide range of individual preferences and abilities
Simple and Intuitive Use	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level
Perceptible Information	The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities
Tolerance for Error	Design minimizes hazards and the adverse consequences of accident or unintended actions
Low Physical Effort	The design can be used efficiently and comfortably and with a minimum of fatigue
Size and Space for Approach and Use	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility

(Source: College of Design, North Carolina University)

2.4 The Importance of Public Buildings in Putrajaya

Malaysian government's decision to built Putrajaya was done to improve quality urban living and environment in the capital city, Kuala Lumpur, and Klang Valley area, by decentralizing the traffic congestion problem and high land value (John, 2006; Siong, 2006). A survey study on residents' perception of Putrajaya identity found that most respondents indicated buildings as the unique symbols and distinctive identity to Putrajaya (Ismail, Shamsuddin and Sulaiman, 2008). This shows that architecture is the main attraction to the city tourists as well as the residents, thus, it is significant to ensure that public buildings in Putrajaya are user-friendly and free from barriers that may hinder such development of city.

Other than the "Garden, Intelligent City" theme, the city planning was also driven by a "caring society" program which emphasizes on security and barrier-free environment for all. In response to the "caring society" program, Siong (2006) establishes that all buildings in Putrajaya was designed in the accordance to several Malaysian Standards for accessibility; MS 1184:1991 Code of Practice on Access for Disabled People to Public Buildings, and MS 1331:1993 Code of Practice on Access for Disabled People Outside Buildings. However, some revisions have been done to those standards since the first construction commenced in 1996. Therefore, by conducting this research, this study intend to evaluate the accessibility in several public buildings in Putrajaya with the revised MS 1184 and MS 1331, so that any improvements needed can be suggested for future modifications.

3.0 Methodology

The five public buildings being assessed in this study is chosen according to their significances to public, and the regularity of public visiting in a daily basis. These buildings

are the Department of Immigration office, Perdana Leadership Foundation building, Putrajaya Hospital, Putrajaya International Convention Centre, and Tuanku Mizan Zainal Abidin Mosque. Each of them functions differently as a government administrative office, an educational foundation, a health service centre, a conference or event place, and a worshipping place.

This study's data collection involves site observation of the five public buildings. The main public facilities of each building; parking space, pedestrian walkways, guiding blocks, ramps, main entrance, doors and doorways, corridor and interior pathways, information counter, stairways, elevators, escalators, praying room and ablution area, building's signage, public restroom, and accessible restroom; are measured and evaluated using guidelines from the Malaysian Standards for accessibility; MS 1184: 2002 Code of Practice on Access for Disabled People to Public Buildings, and MS 1331:1993 Code of Practice on Access for Disabled People Outside Buildings; and universal design principles. The checklists of design requirements derived from MS codes and universal design principles are completed based on researcher's measurement and observation of those facilities. Photographic documentation is also taken for further analysis of the current facilities condition. The checklists and photographic documentations were then analyzed qualitatively.

4.0 Results & Discussions

From site observation checklists, the accessible facilities provided in five buildings in Putrajaya was evaluated and summarized as in Table 4:

Table3: The Buildings' Evaluation Based on Design Requirements from Ms and Universal Design Principles

Buildings	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	Score (out of 75)
Department of Immigration	Red	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Red	Green	Green	Green	Blue	Green	Blue	Green	57
Perdana Leadership Foundation	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Red	Green	Blue	Blue	Blue	Yellow	Blue	Green	60
Putrajaya Hospital	Blue	Red	Red	Red	Yellow	Yellow	Yellow	Blue	Green	Green	Blue	Green	Yellow	Blue	Green	51
PICC	Blue	Red	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Yellow	Blue	Yellow	Blue	Green	61
Tuanku Mizan Mosque	Blue	Yellow	Blue	Yellow	Yellow	Blue	Yellow	Red	Green	Green	Green	Yellow	Yellow	Blue	Yellow	60

Legend:

Parking Space

- (f) Doors and Doorways
- (k) Escalators

Pedestrian Walkways

- (g) Corridor and Interior Pathways
- (l) Praying Room and Ablution Area

Guiding Blocks

- (h) Information Counter
- (m)verall Building's Signage

Ramps/ Foot Ramps

- (i) Stairways
- (n) Public Restroom

Main Entrance

- (j) Elevators/Lifts
- (o) Accessible Restroom

Score	Description
5	All requirements met/ Facility is not provided but it is not necessary
4	Most of the requirements met
3	Equal proportion of requirements met and not met
2	Most of the requirements are not met
1	not provided even though it is necessary

Among the five buildings, result shows that PICC (scored 61 points over 75) provides better accessibility to public, followed by Tuanku Mizan Mosque (60/75), Perdana Leadership Foundation (60/75), Department of Immigration (57/75), and lastly Putrajaya Hospital (51/75). PICC, Tuanku Mizan Mosque, and Perdana Leadership Foundation meet all the design requirements for 46.67% of their main public facilities, while Department of Immigration and Putrajaya Hospital recorded 33.33% and 26.67% of their facilities that fulfill all the requirements. The red indicators show Putrajaya Hospital verified to 26.67% of facilities that do not meet all the design requirements, higher than Department of Immigration with 13.33% while the other three buildings do not meet all the design requirements for only one out of the fifteen facilities being evaluated in these buildings. From the result, it is also shown that main entrance provides the most excellent accessibility in all five buildings while the poorest accessibility is recorded for information counter.

In general, major flaws in terms of the accessibility found from this study are shown in the design of guiding blocks, information counter, and ablution area. Guiding blocks are either not provided or incorrectly installed in the exterior area of these five buildings. For instances, guiding blocks with line and dot bearings were incorrectly installed at Tuanku Mizan Mosque and Department of Immigration building. Guiding blocks with line bearings are supposed to show the direction of pathways, however, at Tuanku Mizan Mosque, the lines direct to the wrong ways. Similarly inappropriate, the dot bearings which function as warning signal were installed as all guiding blocks at the Department of Immigration buildings, including guiding blocks that are supposed to show directions to the users. These incorrect installations may risk user's safety and confuse those who are in need of tactile indication to move around. In Putrajaya Hospital case, no guiding blocks are provided even though the parking space and pedestrian

pathways are located quite a distance from the main entrance of the building.

Another facility that is lack of accessibility in this study is the information counter. All information counters except the ones in PICC and Putrajaya Hospital are too high for children or people on wheelchair to reach and do not provide space for wheelchair to roll under. This does not meet the design guidelines of MS and universal design which require appropriate height of counter and space underneath the work surface. Information counter is an important facility because it is the first place visitors may approach to get help or get information about the building way findings. If the counter is not reachable by some visitors, it may intimidate them and give negative first impression of the accessibility of overall building interior.

Other than guiding blocks and information counter, ablution area is another facility with low accessibility found in this study. Ablution areas in all five buildings except Tuanku Mizan Mosque are built with level changes in front of the water faucets. This hinders less-able people such as wheelchair user, the elderly and crutches user to approach those faucets in order to clean themselves before performing pray. Tuanku Mizan Mosque shows the best solution for the design of accessible ablution area. With no level changes, the design manages to provide accessibility, yet ensure safety by using non-slippery materials for the floor finishes. The ablution areas in Tuanku Mizan Mosque are also provided with good lighting for users' ease of visual access while using the facility

5.0 Conclusion and Recommendations

Based on the overall findings, more than half of the main facilities provided in each assessed buildings of this study meet most of the design requirements from MS and universal design principles. Not much huge modifications need to be done to the facilities; however a small modification can contribute to large improvement to the buildings' overall accessibility. In Tuanku Mizan Mosque for example, the buildings doors and doorways can become perfectly accessible if all floor level changes or thresholds are made lower than 10mm. This may give a huge impact to the overall accessibility of the building because there are many unnecessary level changes more than 10mm found in its interior. In addition, modifying this flaw will not impact the aesthetic value of the building's design so much. Other modifications for all buildings can be easily made to most of the facilities with low accessibility such as the guiding blocks, ramps, information counter and ablution area because these facilities are not structural compared to other facilities like stairways, elevators, and interior corridors.

Even though the overall accessibility for most buildings in this study shows satisfactory applicability of Malaysian Standards and universal design implementation, further analysis using different approaches such as facilities simulation, questionnaire survey to facilities' users, and interviews with building managers are needed to strengthen and validate the research's methodology even more. Assessing the accessibility of public buildings in Putrajaya from different perspectives such as user's perception, building manager's view and user's experience may help finding other new and significant recommendations in ensuring a more barrier-free environment in the city.

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