Public toilet design criteria for users with walking disability in conjunction of universal design paradigm

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Abstract

This research aims to investigate problems and prospects leading to universal public rest room design for the mobility impaired to facilitate their accessibility and usability in the Thai anthropometric and behavioral contexts. The research examines the spatial barrier, the extent of mobility constraints, user’s behavior, and the needs for enabling environment. By means of BME testing, the research endeavors to derive the spatial and dimensional solutions. Areas of interest to be explored include circulation areas for rest room access, major activity areas around the toilet bowl and lavatory, and spatial/height measurements for face/hand washing and teeth brushing activities.

Keywords: Walking disability, universal design, public toilet design.

1. Introduction

Disability is considered one of the constraints to survive in a city. People with any kind of impairments should be treated as same as people without disabilities. Instead of being treated as a source of social burden, people with disability due to physical impairment could be crucial resources in any particular society. The state of handicap is largely derived from barriers created by the unfriendly environment and utensils they are bound to use. The individuals could still perform their societal role despite of their physical impairment, provided that the environment/utensil enables them to do so. In the busy urban environment, a public toilet becomes one of the most necessary human amenities. However, many poor-designed public toilets usually ignore some special needs of the disabled especially their mobility. As a result, the disabled people can not share the common utilities with the others and are ultimately discriminated from the society.

The paper aims to study the designing factors that can used to create an enabling environment for impaired people. Using case studies in Bangkok, the research examines the existing issues and problems of public toilets in terms of physical environment, internal functions and users’ behaviors. Except for the functional aspect, size and style of the public toilets can serve also the aesthetic of the built environment in designing process.
2. Theoretical Background

Derived from the literature review, theoretical basis of the research includes six main groups of theories and related concepts: characteristics of disabilities, universal design (design for all), environmental design, human behavior, Body Motion Envelope (BME) technique, and public amenity design. Figure 1 illustrates the framework of this research and linkages between groups of interesting variables.

2.1. Characteristics of Disabilities

The first trait of theory dealing with the characteristics and constraints of the physical impaired from the waist down, which comprises individuals who move on wheelchair, cane, and walker. Disabled people are categorized into different levels with regard to their ability to move from level 1 to level 5. The higher the level is, the more mobility. People with physical impairments from the waist down can move by using crutch, walker, or wheelchair. Some impairment classified as severe, such as losing motion in organ from missing limb(s) and muscle paralysis from cerebral palsy or sick from chronic illness, can make performing an everyday task more difficult. Some may become dependence on crutch, walker, wheelchair and prosthetic devices for supporting their movement (Kittham. 2008).

The mobility-impaired people, who are categorized in level 4, can perform their daily activities, such as going out, studying, doing hobbies, and socializing, under adapted environment designed for disabled people. For the higher level: 5, impaired people can be fully independent and performing their daily activities as same as the normal people do (Anuprasert. 2002). In so doing, physical environment both internal and external aspects of building should be specially designed in order to facilitate the movement of impaired people and encourage them to participate in any social activities (Thai Disabled Development Foundation. 2001).

2.2 Universal Design

The second line of thought explores the notion of universal design and its previous research, especially for restroom design. The universal design in this paper focuses on the principles of public toilets for all. (Sawadsri. 2003). proposed seven principles of the universal design: equitable, flexible, simple, tolerant, convenient, and suitable size and place. The design should be used by anyone, flexible to use for example by left- and right-handed people, simple enough to understand how to use, tolerant to the misuse, convenient, and practical in terms of size and place.

2.3 Environmental Design

The third group of review examines the problem and solution of restroom environment to accommodate users with disability. The study focuses on the environmental factors determining accessibility of public toilets for mobility impaired people. Unfriendly and unsupportive toilet environment usually bars the physical impaired from getting access or from proper utilization in accordance with their anthropometric limitations. In addition, the physical design should also provide the necessary privacy for the toilet users (Department of public works and town & country planning, 2005). To universally facilitate individuals as such, one needs a design guideline relevant to the users’ behavior and their particular physical constraints. There emerges a body of literature describing empirical results applicable to universal design; yet they are conducted in the Eurocentric context. Guidelines pertinent to the Thai society are still vague and in the initial stage.

2.4 Human Behavior

The forth assemblage of theory reviews the behavioral prospects of normal restroom usage as part of the universal design framework. The group of concepts focuses on needs and behaviors of disabled as well as the relationships between human behaviors and physical environment. There are two important factors determining the users’ behaviors or performances: human factors and physical environment. The human factors include physiological influences, personalities, and social and cultural factors. The physical environment could determine human behaviors in two opposite ways: enhancing social interaction (Socio petal) and creating social barriers (Socio fugal).
The human and environment interaction comprises three processes: perception, cognition and overt behavior or spatial behavior. Both perception and cognition are emotional responses and considered as covert behavior. These processes are all related and happening in succession. The relationships between environment and human behaviors are considered in terms of feeling, dimension, direction, symbol, social interaction, and multi-culture.

2.5 Body Motion Envelope (BME)

The fifth set of theory reviews the human ergonomic and anthropometric testing methodology such as the Body Motion Envelope (BME) method. By means of BME testing, the research endeavors to derive the spatial and dimensional solutions for universal rest room design to accommodate the behavioral and functional needs of the mobility impaired. Areas of interest to be explored include circulation areas for rest room access, major activity areas around the toilet bowl and lavatory, and spatial and height measurements for face /hand washing / teeth brushing activities (Tipien. 2008).

2.6 Public Amenity Design

The final set of review deals with the component of public rest room, its potential problem, material, and equipments necessary for the utilization of users with disability. Prospective variables to be tested and associated in this study include 1) attributes of users with disability, 2) component of restroom where constraint usually occurred, 3) attributes of normal restroom users, 4) factors attributing to the success of usage, 5) method of testing leading to appropriate solution for bath room usage towards the creation of design criterion.

This research thus aims to investigate problem and prospects leading to universal public rest room design for the mobility impaired to facilitate their accessibility and usability in the Thai anthropometric and behavioral contexts. The research thus endeavors to examine the areas and extent of spatial problems usually occurred in the public rest room. It proposes to study the extent of mobility constraints, user’s behavior, and the needs for enabling environment for the potential users with mobility disability. By means of BME testing, the research endeavors to derive the spatial and dimensional solutions for universal rest room design to accommodate the behavioral and functional needs of the mobility impaired.
3. Research Design/ Methodology

Methodologically, subjects of the research are individuals with disability from the waist down who are either assisted by wheelchair, cane, or walker, which are potential users barred by the unfriendly environment. They will be sampled from a rehabilitation center as informant and testing subjects for spatial and anthropometric measurements by means of BME method. Areas of interest to be explored include 1) circulation areas for rest room access, 2) major activity areas around the toilet bowl and lavatory, 3) spatial and height measurements for face /hand washing / teeth brushing activities.

4. Expected Results/ Conclusion

As mentioned above, this research aims to investigate problem and prospects leading to universal public rest room design for the mobility impaired to facilitate their accessibility and usability in the Thai anthropometric and behavioral contexts. This paper, thus, presents the complete research design procedure as well as tools and methods to investigate the factors determining the appropriate design of public toilets that are accessible and practical for the disabled. The extent of spatial problems and solutions occurred in the designing of public toilets is investigated. Finding from this research will derive a set of design criterion crucial for universal toilet design that can accommodate the behavioral and functional needs of the mobility impaired people in general and also suitable for the Thai context in particular.
References


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