

Comparative Analysis of Existing Guidelines on the Pedestrian Facilities for Person with Disabilities (PwD)

Suriani Ngah Abdul Wahab^{1*}, Dzatn Aiman Zaharuddin¹, Shahela Mamter¹

¹ Department of Built Environment Studies and Technology, College of Built Environment, Universiti Teknologi MARA (UiTM), 32610, Perak Branch, Perak, Malaysia

*Corresponding Author: suria275@uitm.edu.my

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Abstract: *Malaysia, being a developing nation, has actively participated in endeavours to ensure equal opportunities for individuals with disabilities through its recent legislation, the Persons with Disabilities Act 2008. However, there remains a significant challenge regarding the accessibility of pedestrian facilities for Persons with Disabilities (PwDs). It is crucial to address this issue promptly and find ways to enhance pedestrian infrastructure in order to provide comfort and satisfaction to all users, regardless of their abilities. Consequently, a framework outlining criterion for pedestrian facilities specifically designed for PwDs has been established. This research aim is to identify the existing guidelines on the pedestrian facilities. It specifically studies on Klang Valley guideline for designing a pedestrian facility especially for those PwD. This research is based on data obtained from survey questionnaire and document analysis of current guideline of Malaysia, Indonesia, Singapore and United Kingdom. The data was analysed to identify the existing guidelines on the pedestrian facilities. The research suggested that successful pedestrian facilities as pedestrian facilities that is comfort to be used by all users regard the ability. The results of the study also suggested that a holistic improvised to ensure that the PwD could reach any area independently. It is hope that the study can contribute to the improvement pedestrian facilities for PwD in Klang Valley.*

Keywords: Pedestrian facilities, Person with Disabilities, guidelines

1. Introduction

Pedestrians, including People with Disabilities (PwD), rely on government-provided facilities such as sidewalks, curb ramps, lighting, and amenities to travel and engage in daily activities (Bharucha, 2017; Gray et al., 2012; Rosenberg et al., 2013; Shinar, 2007; Tanan & Darmoyono, 2017; Torres-Ruiz et al., 2018; Washburn et al., 2006; Yen et al., 2014; Zacharias, 2009). PwD, who cannot drive independently, depend on pedestrian facilities to socialize, and carry out their daily tasks (United Nations. Economic and Social Commission for Asia and the Pacific, 2018). However, the current state of pedestrian facilities for PwD is unsatisfactory, with issues such as poor maintenance and improper construction, including uneven sidewalks and manholes. In Malaysia, over 500,000 PwD have registered with the Social and Welfare Department, highlighting the need for improved accessibility and inclusive design in pedestrian facilities to ensure the safety and equal participation of all individuals (Social and Welfare Department, 2021). The Person with Disabilities Act (2008) emphasizes the right of PwD to access and use

public facilities, including pedestrian facilities, and calls for appropriate and accessible design to accommodate their needs. The aim of the study is to compare the existing guidelines on the pedestrian facilities for person with disabilities (PwD). The research question that can be developed is what are the key differences in existing guidelines on the pedestrian facilities for person with disabilities (PwD) across different countries or regions? The study focused on the existing guideline of pedestrian facilities for the PwD facilities in Klang Valley. Respondents for the study are limited to PwD who are visual impaired and wheelchair user. This is to ensure that the respondent can make a clear need in pedestrian facilities for PwD.

2. Literature Review

Definition of Pedestrian Facilities

Pedestrian facilities are any sidewalk, intersection, crosswalk, street, curb, curb ramp, walkway, pedestrian right of way, pedestrian undercrossing, pedestrian overcrossing, or other pedestrian pathway or walk of any kind that is owned, controlled, or maintained in whole or in part by local authority (Law Insider Inc, 2022). Below shows some of the pedestrian facilities that have been provided in Malaysia.



Figure 1: Sidewalk

According to the Oxford Dictionary (1948), sidewalk refers to a level surface located alongside a road, intended for pedestrians to traverse which the picture presented in Figure 1 depicts a sidewalk that is being used by pedestrians.



Figure 2: Crossing zebra

Crossing zebra or also known as cross walk in Oxford Dictionary (1948) as shown in Figure 2 stated that it is a part of a road to allow people to cross.



Figure 3: Curb ramp

The words curb and ramp has been separated in Oxford Dictionary (1948). Curb is the edge of the raised path at the side of a road, usually made of long pieces of stone while ramp is a slope that joins the two parts of a road, path and building, when one is higher than the other. Figure 3 shows a picture of curb ramp that will help wheelchair pedestrian to move up or down from the road to the sidewalk.

Crossing traffic usually being placed near with crossing zebra to help pedestrian to cross the road safely by using the traffic light that will guiding all the road users such as when the crossing traffic turns green, the pedestrian may pass the road while for the other road user such as driver or rider, the traffic on their side, will turns red to allow the pedestrian pass the road safely.

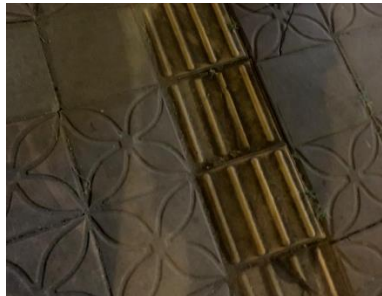


Figure 4: Tactile

Tactile is made for the blind people to guide their path all the way of their walk from one place to another as shown in Figure 4. This is to ensure that they are in a safe place.

Definition of People with Disabilities (PwD)

Being disabled is a natural part of being human. Almost everyone will be disabled, either temporarily or permanently, at some point in their lives. Over 1 billion individuals (roughly 15% of the global population) are currently disabled, and this figure is rising due to population ageing and an increase in the frequency of noncommunicable diseases. Disability is caused by the interplay of people with health conditions such as cerebral palsy, Down syndrome, and depression with personal and environmental variables such as unfavourable attitudes, inaccessible transportation and public buildings, and a lack of social support. The surroundings of a person have a significant impact on the experience and level of disability. Inaccessible surroundings create hurdles that frequently prevent people with disabilities from fully and

effectively participating in society on an equal basis with others. Addressing these hurdles and assisting people with impairments in their daily lives can help improve social engagement (World Health Organization (WHO), 2022). People with Disabilities has been defined as person that is disability either in terms of physical, mental, intellectual or senses such as eyes and ears which when they faced with various obstacles, they may not be able to engage fully and effectively with community (Social and Welfare Department, 2022), persons with disabilities are persons who have long-term physical, mental, intellectual, or sensory impairments that, when combined with additional impediments, prevent them from fully and effectively participating in society on an equal footing with others United Nation (2022). World Health Organization (WHO), (2022) has divided disabilities 3 dimensions which are; impairment in a person's body structure or function, or mental functioning; examples include limb loss, vision loss, and memory loss, limitations in activity, such as difficulty seeing, hearing, walking, or problem solving, and work, social and recreational activities, and access to health care and preventive services are all restricted (World Health Organization (WHO), 2022).

According to the (Social and Welfare Department, 2022), there are 7 categories of disabilities which are hearing disability, visually impaired, speech disability, physical disability, learning disabilities, mental disability, and multiple disabilities.

Visually Impaired is someone that is blind in both eyes, blind in one eye, limited vision in both eyes, or any other long-term visual impairment. Visual impairments are classified as follows: Vision impairment: Vision lower than 6/18 but equal to or better than 3/60 even with visual help, or a visual field smaller than 20 degrees from fixation

Blind: Fewer than 3/60 vision or a visual field of less than 10 degrees from fixation

Physical disability, whether due to loss or absence, or inability of any body part that can impair their functions in fully carrying out basic actions. Self-care, mobility, and changing body posture are examples of basic activities. Injury (trauma) or disease in the neurological, cardiovascular, respiratory, hematological, immunology, urology, hepatobiliary, musculoskeletal, gynecological, and other systems that produce malfunctions such as:

- i. Limb defects (congenital/acquired), including loss of thumb.
- ii. Spinal Cord Injury [Only if there is no return of functions after six months]
- iii. Stroke [Only if there is no return of functions after six months]
- iv. Traumatic Brain Injury
- v. Dwarf (Achondroplasia) that is
- vi. < 142 cm for male and < 138 cm for female
- vii. Cerebral Palsy

Requirement Malaysia towards Pedestrian Facilities

Government of Malaysia in has enforced to provide a guideline for Person with Disabilities facilities inside and outside of a building also the surrounding area of the building. The guideline has been published by Ministry of Housing and Local Governance guided with Malaysian Standard. There are few Malaysian Standard (MS) that is use for the reference to provide facilities specifically for Person with Disabilities such as MS1184:2002, MS1183: Part 8: 1990 (P), MS1331:2003 and MS2015: Part 1: 2006 (Ministry of Local Government Development, 2011)

In Uniform Building By-Law (UBBL) 1984, Section 34A has mentioned the needs to provide the facilities for the Person with Disabilities to access the building, in and out and also surrounding area of the building (Ministry of Local Government Development, 2011).

Person with Disabilities Act 2008

The Persons with Disabilities Act of 2008 was enacted to provide for the registration, protection, rehabilitation, development, and well-being of people with disabilities, as well as the establishment of the National Council for Persons with Disabilities and other related matters. It also to recognize that disability is a dynamic term and that disability comes from the interaction between people with disabilities and attitudinal and environmental barriers that prevent them from participating fully and effectively in society on an equal footing with those without disabilities, recognize the valuable current and potential contributions that people with disabilities make to the overall well-being and diversity of the community and society, recognize the significance of accessibility to the physical, social, economic, and cultural environment, as well as to health and education, as well as to information and communication, in enabling people with disabilities to participate completely and effectively in society, recognize that people with disabilities have the right to equal opportunity, protection, and help in all circumstances, subject only to the limitations, restrictions, and rights protection established by the Federal Constitution, and recognize the importance of collaboration between the government, the private sector, and non-governmental organizations in enabling people with disabilities' full and effective involvement and inclusion in society.

In Chapter 1 of the Persons with Disabilities Act 2008, Clause 26.1, it is stated that people with disabilities have the same right as other people to access public facilities, amenities, services, and buildings, unless it will injure them. Clause 26.2 said that the government and providers should offer appropriate and planned design to enable individuals with disabilities to access and use public facilities, amenities, services, and structures (Government of Malaysia, 2014).

Others Act

According to Uniform Building By-Law (UBBL) 34A (1991), which is specifically for people with disabilities, any building or part of a building should be approved with access to allow disabled people to get into, out of, and within the building for which access is provided either entirely or primarily for the inspection, maintenance, or repair of the building, its services, or fixed plant or machinery, designed with facilities for use by disabled people. This condition must be met in accordance with Malaysian Standards MS1183 and MS 1184.

There are 3 Malaysian Standard (MS) that mentioned person with disabilities which should be followed by designers during planning stage, which are:

- i. Code of Practice MS1183:2015 Fire Safety in the Design, Management and Building is regarding a specification for fire precautions in the design and construction of buildings.
- ii. Code of Practice MS1184:2014 Access for Disabled Inside Public Buildings is related to code of practice on access for disabled persons to public buildings.
- iii. Code of Practice MS1331:2003 Access for Disabled Person Outside Public Buildings is concerning a code of practice for access of disabled persons outside buildings.

3. Research Design

The research methodology used in this study is structural analysis Kumar (2011), with data gathered through document analysis. The study focuses on evaluating the criteria framework for pedestrian facilities for disabled individuals in the Klang Valley region. The research is

conducted in three phases: literature review, data collection, and data analysis. The literature review involves gathering secondary data from various sources such as books, journals, articles, and online resources. In the data collection phase, document analysis is carried out, comparing pedestrian facility guidelines from different countries including Malaysia, Indonesia, Singapore and the United Kingdom. The aim is to compare the existing guidelines on the pedestrian facilities for person with disabilities (PwD). In order to achieve the aim of this study, to establish pedestrian facilities criteria framework for person with disabilities (PwD) in Klang Valley. The research design that is being implemented as shown in Table 1.

Table 1: Research Design

Research Question	Research Objectives	Data Collection Method	Data Analysis Method	Expected Outcomes
RQ: What are the key differences in existing guidelines on the pedestrian facilities for person with disabilities (PwD)?	RO: To identify the key differences in existing guideline on the pedestrian facilities for person with disabilities (PwD).	Document Analysis	Qualitative	Distinguish the key differences existing application of guideline on the pedestrian facilities.

The research question asks about the key differences in existing guidelines on pedestrian facilities for person with disabilities (PwD), while the research objective is to identify the key differences in existing guideline on the pedestrian facilities for person with disabilities (PwD). The data collection method chosen for this research is document analysis, which involves examining and studying existing documents such as reference books, journals, and articles that discuss pedestrian facility guidelines. The data analysis method is qualitative analysis, where the collected documents will be analysed to gain insights into the application of these guidelines. The expected outcome of this research is to distinguish how the existing guidelines are being implemented and utilized in the context of pedestrian facilities.

Data Analysis

Four countries, namely Indonesia, Singapore, Malaysia, and the United Kingdom, have been chosen for comparison in terms of guidelines for pedestrian facilities. These countries were selected based on their relevance to the Klang Valley area in Malaysia and their similar climatic and geographical characteristics. The inclusion of the United Kingdom is particularly important as Malaysia often adopts construction methodologies inspired by UK practices. This comprehensive selection allows for a thorough understanding of construction principles and considerations specific to the study's focus. By analyzing these countries, a robust criteria framework for pedestrian facilities can be proposed, ensuring the effective implementation of best practices.

Malaysia

In Malaysia, guidelines have been established to ensure accessibility and inclusivity for individuals with disabilities in public buildings and pedestrian areas. These guidelines cover various aspects, such as ramps, pedestrian paths, sidewalks, crossing zebras, curb ramps, tactile indicators, handicapped parking spaces, drop-off areas, and ramps inside buildings (Department of Public Work, 2014).

For ramps at the main entrance, the guidelines specify the minimum width of 1.2 meters, the inclusion of platforms at the beginning and end of the ramp, and the use of the adjacent wall as a guide for visually impaired individuals.

Pedestrian paths should be continuous, free of physical barriers, well-lit, sturdy, flat, water-absorbent, and non-slippery. The width of the path depends on the expected traffic, and passing and turning spaces should be provided every 25 meters. Tactile blocks should be included along the main paths for visually impaired individuals buildings (Department of Public Work, 2014). Sidewalks should have a gentle incline, manageable gradients, a minimum width of 1.5 meters, and provisions for benches. The width of the sidewalks should not be less than 2.25 meters, and relief areas should have a minimum width of 1.5 meters buildings (Department of Public Work, 2014).

Crossing zebras, or pedestrian crossings, should have curb ramps, gentle slopes, flat surfaces, danger signs, and accessible pedestrian signals incorporating sound, visuals, and vibrations buildings (Department of Public Work, 2014).

Curb ramps should have specific slope ratios, non-slip surfaces, contrasting colors, and a minimum width of 0.9 meters buildings (Department of Public Work, 2014).

Tactile indicators, such as dot-type and line-type indicators, should be placed near potential hazards and provide directional guidance. They should have specific dimensions and be made of materials that can be sensed by the soles of the feet buildings (Department of Public Work, 2014).

Handicapped parking spaces should be located within 20 meters of the main entrance, with the number of spaces determined based on the number of regular parking spaces provided buildings (Department of Public Work, 2014).

Drop-off areas should be clearly marked, include curb ramps if needed, and provide waiting seats for passengers buildings (Department of Public Work, 2014).

Ramps inside buildings should meet certain criteria, including minimum width, clearance width, handrails, maximum slope, and tactile warning blocks at the beginning and end of each side.

These guidelines aim to ensure safe and convenient access for individuals with disabilities, allowing them to navigate public spaces independently and with the necessary facilities and support buildings (Department of Public Work, 2014).

Indonesia

In Indonesia, the guidelines and regulations for pedestrian facilities focus on ensuring accessibility, safety, comfort, and humanism for all individuals. Based on (Presiden Republik Indonesia, 2002), stated in the Law Building Indonesia No. 28 (2002), Article 27, emphasizes the need for easy, safe, and convenient facilities and accessibilities within buildings, including provisions for disabled and elderly persons. The law stipulates that the facilities and accessibilities inside and outside the buildings should cater to the needs of disabled and elderly persons, with the specific implementation details governed by government regulations (Menteri Pekerjaan Umum Republik Indonesia, 2014).

To further address pedestrian facilities, the Indonesian government introduced the Non-Motorized Transport (NMT) Policy in 2017. This policy aims to improve the distribution of road space and sidewalks, providing design guidelines and estimated budget allocations. Under the NMT Policy, sidewalk space is divided into different areas, including building façade, variation space, pedestrian space, bicycle lane or furniture area, and buffer area and utility area. This division helps to ensure proper allocation and organization of pedestrian facilities to enhance the overall pedestrian experience (The Institute for Transportation Development Policy (ITDP), 2017).

The NMT Policy emphasizes several key elements in the design and construction of pedestrian facilities. Completeness is one such element, which entails establishing a comprehensive network of pedestrian facilities that serve multiple purposes and connect various destinations. This includes the provision of walkways, crossings, access to transit, complementary land uses, access to food, and access to public spaces. By incorporating these elements, pedestrian access is improved, promoting walking as a mode of urban transportation and connecting Jakarta residents effectively (The Institute for Transportation Development Policy (ITDP), 2017).

Safety is another crucial aspect addressed in the guidelines. Various safety measures are recommended, such as speed regulation, proper lighting to ensure road visibility and attract pedestrians during nighttime, installation of bollards with suitable gap width to enhance safety and prevent vehicle intrusion on sidewalks, control of driveway density to increase pedestrian safety, provision of pedestrian refuge through crossing islands for multi-lane traffic, sidewalk extension to reduce crossing distances, and curbs to restrict vehicles from encroaching on pedestrian facilities.

Comfort is also considered in the design of pedestrian facilities. To enhance user comfort, the guidelines suggest the provision of shades and shelter, visually active frontage to create an engaging walking environment, permeable frontage for better air circulation, small blocks that promote walkability, seating for resting purposes, trees or landscaping to improve aesthetics and provide green spaces, and wastebins for proper waste management. These elements contribute to a pleasant and enjoyable pedestrian experience (The Institute for Transportation Development Policy (ITDP), 2017).

In line with the principle of humanism, the guidelines acknowledge the diversity of pedestrian facility users. Special attention is given to the different needs and abilities of individuals, particularly those with disabilities. Tactile features, such as warning blocks and guided blocks, are recommended to assist visually impaired individuals. Wayfinding signage is essential for pedestrians to navigate unfamiliar areas easily. Additionally, ramps are suggested to provide accessible slopes for wheelchair users, with specific requirements for slope ratio and width to ensure usability and safety (The Institute for Transportation Development Policy (ITDP), 2017).

By incorporating these comprehensive guidelines and considerations, Indonesia aims to develop pedestrian facilities that are accessible, safe, comfortable, and human-centric. These guidelines not only cater to the needs of pedestrians in general but also prioritize the inclusion and accommodation of individuals with disabilities, ensuring that all individuals can navigate the urban environment with ease and dignity.

Singapore

The Singapore Walking and Cycling Design Guide introduces road elements such as footpaths, cycling paths, covered linkways, and more. It aims to benefit wheelchair users and visually impaired individuals. The guide emphasizes wider footpaths, tactile tiles for crossings, covered shelters, adequate lighting, and accessible bus stops. These elements promote inclusive and safe infrastructure for all pedestrians (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

To enhance the walking experience and promote accessibility, Singapore has implemented various road elements and features as part of its Walking and Cycling Design Guide. The guide, developed by organizations such as the Land Transport Authority, Urban Redevelopment Authority, Building and Construction Authority, JTC, Housing & Development Board, PUB Singapore's National Water Agency, and National Parks Singapore, focuses on improving pedestrian infrastructure and addressing the needs of different user groups (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

One essential element addressed in the guide is the footpath, which is designed to facilitate pedestrian movement and improve overall connectivity. The footpath is intended to be accessible, safe, comfortable, and well-maintained, promoting walking as a mode of transportation for short-distance commuting. The design specifies an increased width for standalone footpaths, from 1.50m to 1.80m, providing adequate space for two typical wheelchairs to pass each other comfortably (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

Concrete is the recommended material for footpaths due to its proper skid resistance (BPN ≥ 450) and durability. It is crucial to ensure good levelling and workmanship of floor finishes to prevent undulation and protrusions that could cause trips and falls. Regular maintenance and renewal of footpaths are essential to maintain a non-slip and level surface (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

For visually impaired individuals, tactile tiles are introduced at crossing areas to serve as warning indicators, reminding pedestrians, especially those with visual impairments, to exercise caution while crossing the road. These tiles provide tactile feedback and assist visually impaired individuals in navigating the environment safely (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

To provide protection against weather conditions, covered linkways and covered walkways are incorporated into the pedestrian infrastructure. Covered linkways are shelters built over footpaths, protecting pedestrians from rain and sun as they move between different locations. The standard dimensions for covered linkways include a height-to-width ratio of 1:1 (2.4m height and 2.4m width) with a 30-degree angle to the rain line. Rest areas along covered linkways are also designed to enhance the walking experience, particularly for the elderly and wheelchair users (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

Provision of adequate lighting is crucial to ensure visibility and safety for pedestrians. Lights and lighting fixtures should be securely located within the roof rafters of covered linkways to minimize the risk of damage. Covered walkways, similar to covered linkways, are introduced

in development areas to provide shelter and protection from the elements (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

To manage water flow and drainage, roadside drainage systems are designed with the concept of transforming open drains into box drains that can double as footpaths or cycling paths. These box drains are part of the road reserve and should adhere to drainage requirements specified in the Code of Practice on Surface Water Drainage. Adequate space should be allocated for drains, even if additional space beyond the road reserve is required (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

Bus stops in Singapore are designed to provide convenience and safety to commuters. They consist of several components, including bus shelters, bus bays, bus poles, information panels, and safety bollards. The bus shelters are designed with a width that allows for seating, wheelchair access, and standing space for commuters. Steps are not allowed in the alighting and boarding areas to ensure a barrier-free experience for all users (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

Street lighting is essential along paths located alongside roads to enable pedestrians, cyclists, and motorists to identify and respond to various situations. Adequate lighting helps users recognize path alignment, obstacles, potholes, and the position of other users, ensuring safe passage for everyone.

Zebra crossings are installed in areas with lower pedestrian and traffic volume, such as minor roads and slip roads. They are marked with visible lines, flashing beacons, and signs to enhance visibility. Raised zebra crossings are another option, providing accessible and seamless passage for pedestrians by aligning them with the footpath (Land Transport Authority Singapore & Urban Development Authority Singapore, 2018).

United Kingdom

The Department of Transport in the United Kingdom has recently published updated guidelines in line with the Inclusive Transport Strategy 2018. These guidelines take into account the engagement of disabled individuals and representative groups, as well as practitioners in the field. To ensure comprehensive accessibility, the guidelines reference several key sources, including the British Standard BS8300, Approved Documents for the Building Regulations, The Traffic Signs Regulations and General Directions 2016, The Traffic Signs Manual, Design Standards for Accessible Railway Stations, and various advisory leaflets and publications.

One of the main considerations in the guidelines is the provision for different types of users with varying mobility needs. For instance, the guidelines specify minimum passageway widths based on the type of walking aid or assistance required. Individuals using a walking stick require a minimum width of 750mm, while those using two sticks, crutches, or a walking frame need a wider space of 900mm. For visually impaired individuals utilizing a long cane or an assistance dog, a minimum width of 1100mm is recommended. Additionally, when a visually impaired person is being guided, a width of 1200mm is required. When two individuals, one in a wheelchair and one without, need to pass side by side, a width of 1500mm is necessary to accommodate both users comfortably.

In addition to width considerations, the guidelines emphasize the importance of unobstructed height above pedestrian paths, particularly for individuals with low vision. The recommended

minimum height is 2300mm in most cases. However, in sub-surface station platforms, where space may be more confined, a higher clearance of 3000mm is advised. In situations where signage is suspended over footways or pedestrian areas, such as in railway stations, a minimum clearance of 2100mm is acceptable (2300mm on cycle routes).

By providing these specific measurements and recommendations, the guidelines aim to ensure that pedestrian infrastructure across the UK meets the necessary accessibility standards. This will enable individuals with disabilities or mobility challenges to navigate public spaces with greater ease, promoting inclusivity and equal access to transportation and pedestrian facilities.

Table 2: Summary of pedestrian guideline in 4 countries

Countries	Malaysia	Indonesia	Singapore	UK
Pedestrian Guideline				
1. Main entrance	/			
2. Pedestrian paths	/	/	/	/
3. Crossing area	/	/	/	/
4. Curb ramps	/	/		/
5. Sidewalk	/	/		/
6. Tactile	/	/	/	/
7. Handicapped parking	/			
8. Drop off	/			
9. Ramps	/			/
10. Benches			/	
11. Lighting			/	
12. Covered walkway			/	

Table 2 shows the summary of pedestrian guideline for 12 elements that are being differentiated between four countries which are Malaysia, Indonesia, Singapore and United Kingdom.

4. Findings

The table 2 presented above provides a comprehensive comparison of various accessibility features across four different countries: Malaysia, Indonesia, Singapore, and the UK. The table consists of 12 distinct criteria related to accessibility, and each criterion is denoted by a checkbox (/) to indicate its presence or absence in the respective country.

Starting with the first criteria, "Main entrance," it can be observed that all four countries have a main entrance, indicating a basic provision for accessibility. Moving on to the criteria of "Pedestrian paths," Malaysia, Indonesia, and Singapore all have pedestrian paths, while the UK seems to lack this feature. The following criteria, "Crossing area," shows that all countries have designated areas for pedestrian crossing.

When examining the criteria of "Curb ramps," it becomes apparent that Malaysia, Indonesia, and the UK have implemented curb ramps to facilitate accessibility, whereas Singapore does not seem to have this provision in place. Similarly, the presence of "Sidewalks" can be observed in Malaysia, Indonesia, and the UK, while Singapore does not have sidewalks according to the table.

The criteria of "Tactile" denotes the availability of tactile features, which are present in all four countries as indicated by the checkboxes. Moving on to "Handicapped parking," it can be seen

that Malaysia and the UK have designated parking spaces for people with disabilities, whereas Indonesia and Singapore do not.

The criteria of "Drop off" reveals that Malaysia has a designated area for drop-offs, whereas the other three countries do not have this feature. "Ramps," as another accessibility measure, are only present in the UK according to the table.

Moving on to "Lighting," it is shown that Malaysia and the UK have lighting provisions, while Indonesia and Singapore lack this feature.

Finally, the criteria of "Covered walkway" indicates that the UK has implemented covered walkways, while the other three countries do not have this provision.

In summary, this table provides a comprehensive overview of the presence or absence of various accessibility features across Malaysia, Indonesia, Singapore, and the UK. It allows for a quick comparison of the accessibility provisions in different countries, highlighting variations and potential areas for improvement in terms of ensuring inclusive environments for individuals with disabilities.

Criteria framework for the person with disabilities (PwD) facilities in Klang Valley.

	<div style="border: 1px solid black; padding: 5px; margin: 0 auto; width: fit-content;"> Title A Pedestrian Facilities Criteria Framework for Person with Disabilities (PwD) </div>			
Problem Statement	PwD facing inaccessibility to the built environment.	Consideration on equal access to outdoor spaces is still	Public buildings are not accessible for all disabilities such as	Existing pedestrian facilities do not meet requirement with
Aim	The aim of this research is to compare the existing guidelines on the pedestrian facilities for person with disabilities (PwD).			
Research question and Research Objective	1. What are the key differences in existing guidelines on the pedestrian facilities for person with disabilities (PwD)?	1. To identify the key differences in existing guidelines on the pedestrian facilities for person with disabilities (PwD).		
Criteria	Main Entrance – as stated in guideline Malaysia.	Pedestrian Path – as stated in guideline Malaysia.	Crossing zebra – Improve existing of crossing zebra and traffic light.	
	Curb ramps – improvised width	Sidewalk – dividing area	Tactile – Improve existing tactile.	
	Handicapped Parking – for the size; as stated in guideline Malaysia, improvised material surface.	Drop-off – as stated in guideline Malaysia.	Ramps – In term of high as stated in guideline Malaysia.	
	Benches – Add more benches as in guideline Singapore.	Lighting – as stated in guideline Singapore.	Covered walkway – as stated in guideline Singapore.	

Table 3: Criteria framework for the person with disabilities (PwD) facilities in Klang Valley

Criteria	Description
1. Main entrance	<p>As in Table 2, it shows that Malaysia is the only country that has a specific design towards the main entrance area should be maintained as it should has no issue.</p> <p>Sloping: 1:20 Width: Minimum 1200mm</p>
2. Pedestrian paths	<p>As in Table 2, all countries have their own design of pedestrian path. As in, Malaysia has the best design of the pedestrian paths as below because person using two sticks or crutches, or a walking frame, requires 900mm, while a vision impaired person using a long cane, or an assistance dog requires 1100mm. A width of 1200mm is required for a visually impaired person being guided. Side by side, a wheelchair user and a non-wheelchair user require 1500mm width.:</p> <ol style="list-style-type: none"> 1. Constant two-way traffic: $\geq 1800\text{mm}$. 2. Frequent two-way traffic: $\geq 1500\text{mm}$. 3. Infrequent two-way traffic: $\geq 1200\text{mm}$. 4. No-pass traffic: $\geq 900\text{mm}$. 5. Passing and turning space every 25m. 6. Tactile block should be provided at every main pedestrian path. <p>In addition, the pedestrian path should have the walkways, crossings, access to transit, complementary uses, access to food, and access to public spaces.</p>
3. Crossing area	<p>As in crossing area, for a crossing that is too long, the island/ median should be provided as a place to take a rest. In Malaysia guideline has been introduces but, might still have lacking on it to be improvise such as stating the maximum length for each crossing such as in Indonesia they stated around 80-100 meters up to 150 meters.</p> <p>The traffic light for pedestrian use should be revised in term of the existing of the traffic light.</p>
4. Curb ramps	<p>Curb ramps that have been implemented in Malaysia could give a little revised on the width as in Indonesia limit the number of vehicles use the pedestrian facilities. As if stated which is 900mm it is a width of a wheelchair. It should give some little spaces for independent wheelchair user to move the wheelchair itself.</p> <p>Slope could be maintained 1:12.</p>
5. Sidewalk	<p>As in Table 2, sidewalk has been mentioned by Malaysia, Indonesia and UK.</p> <p>The sidewalk also should be dividing area such as the footpath, cycling path, covered linkway, covered walkway, roadside verge, green buffer, roadside drain, bus stop, taxi stand and lighting. The existing of the sidewalk should give particular attention as it is being voted as strongly dissatisfied.</p>
6. Tactile	<p>As in Malaysia the visual impaired person is being introduced with 2 types of tactile need to maintain and give a more attention towards it to maintain the existing tactile however, the existing of the tactile should be improvised.</p> <ol style="list-style-type: none"> a. Dot-type tactile (warning indicator) gives warning signs aimed at warding off physical obstacles and dangers as well as indicating directions and warnings when approaching bends and junctions. <p>Line-type tactile (directional indicator) shows the direction of the route to</p>
7. Handicapped parking	<p>As in the size of the handicapped parking, the size should be maintained as in guideline Malaysia.</p>

Table 4: Criteria framework for the person with disabilities (PwD) facilities in Klang Valley

Criteria	Description
8. Drop off	As in drop-off is being mentioned by Malaysia, the design off the drop off should just be maintained as it is suits enough to be used. Width: 1200mm The width allocate is enough for a wheelchair to be drop-off.
9. Ramps	As in Malaysia has a proper specific design of the ramp and the ramp is should be provided when there's high minimum 300mm. <ol style="list-style-type: none"> 1. The minimum width of the ramp is 1200mm. 2. The minimum clearance width of the ramp is 1000mm. 3. The minimum ramp width for existing areas is 900mm. 4. Handrails at a height between 800mm - 900mm should be installed on both sides of the ramp. 5. The maximum slope of the ramp is 1:12. 6. Tactile warning block should be installed at the beginning and end of the ramp for each side.
10. Benches	Benches could be provided in order to have a rest area along covered linkways are important to ensure the elderly and wheelchair users have a better walking experience as mentioned in guideline Singapore. Located: next to the sidewalk, walkway or pedestrian path Width: 0.8m
11. Lighting	A good lighting is important as it enables pedestrians to various situations. These include recognizing the path's alignment, being aware of sharp bends, humps, and fixed obstacles, identifying objects on the surface like stones or tree branches, spotting potholes or cracks, gauging the position and speed of other users, and being attentive at junctions shared by different users. This could be improvised as mentioned in guideline Singapore.
12. Covered walkway	Covered walkway could be one of an important pedestrian facility as in Malaysia there is not yet mentioned as an important. This is to ensure that the pedestrians are not exposed to the rain. As in guideline Singapore it is stated that: Height: Ratio 1:1 which 2.4m height and 2.4m width with a degree of 30° to the rain line.

5. Conclusion

The comparison of pedestrian facility guidelines in Malaysia, Indonesia, Singapore, and the UK highlights similarities and differences in their approach to accessibility. While all countries prioritize basic accessibility features like entrances, paths, and crossings, variations exist in specific criteria. Malaysia, Indonesia, and the UK have implemented curb ramps, sidewalks, and tactile features, whereas Singapore appears to have limitations in these areas. Malaysia and the UK provide designated handicapped parking spaces, which are lacking in Indonesia and Singapore. Other variations include features like drop-off areas, ramps, benches, lighting, and covered walkways, with the UK demonstrating a more comprehensive approach. It is important for countries to learn from each other and share best practices to improve pedestrian accessibility and promote inclusivity. Policymakers and urban planners can use existing guidelines as valuable resources to address gaps and create more accessible environments. The goal is to ensure that individuals with disabilities can enjoy safe and convenient pedestrian experiences in an inclusive society.

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