GREEN MATERIALS AND BUILDINGS

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PROVISION OF DISABLED FACILITIES AT THE MALAYSIAN ELECTRICAL TRAIN SERVICE (ETS) STATION TOWARDS SOCIAL SUSTAINABILITY

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Abstract **-** Sustainable design for transportation system is important especially for social sustainable of people with disabilities (PWDs). The stations must provide user-friendly facilities for everyone. Although the facilities were provided, but some of them do not function properly and cannot be used by PWDs. The facilities for PWDs must fulfilled with the Malaysian Standards (MS). The research aim at determining the compliance of facilities for PWDs to be provided at ETS stations. Two research objectives were established (1) to identify the range of facilities for PWDs at the ETS station and (2) to investigate the compliance of facilities for PWDs to be provided at ETS stations with the MS. Two ETS stations that build in 2014 and above were chosen for the case study. Purely qualitative methods were adopted. An observation checklist was created based on the MS to see the availability and compliance of the facilities. The findings suggest that there are 10 main facilities for PWDs to be provided at ETS stations. Most of the facilities are available and comply with the MS. Otherwise, the primary way to enhance the social sustainability among PWDs is to provide and improve the facilities for PWDs at ETS stations.
Keywords **-** Facilities, Disabled, PWDs, Social, Sustainable

1 INTRODUCTION

Malaysia is going forward to become a world-class economic region by the year 2025 by improving public transport in the medium-term (Ishak & MadSah, 2016). However, most of the public transport stations face serious problems such as having bad designs and facilities. These issues of bad design and facilities at public stations have become a burden that prevents many people with disabilities (PWDs) from using them as a link to other places (Soltani et al., 2012). Besides, it also limits the access of PWDs that lead knowledge, information, individual achievement and quality of life were hard to achieve (Islam, 2015). Therefore, to overcome these problems, Malaysia agreed to adopt and enact laws so that PWDs would have an equal right to education, employment, and culture life (Rahim, 2015). One of the laws is, it is mandatory for all public buildings to provide access and facilities for PWDs according to the Malaysia Standard (MS) (Islam, 2015). Recently, the electrical train service (ETS) has become people's choice where it equipped with facilities that suitable to use by PWDs such as toilets, seats, lifts, ramp and other facilities. Moreover, the latest facilities that create by KTMB was electronic ticket purchasing using mobile technology (KTMB, 2018). However, some of the stations failed to provide complied facilities for PWDs according to the MS and lacking in the provision of user-friendly facilities (Isa et al., 2016).

With regard to these problems, a research was suggested to determine the researchcompliance of facilities for PWDs to be provided at ETS stations. In line with this aim, two objectives were established (1) to identify the range of facilities for PWDs at the ETS station and (2) to investigate the compliance of facilities for PWDs with the MS.

2 LITERATURE REVIEW

2.1 Person With Disabilities (PWDs) and Issues of Disability in Malaysia

A disability term is used to refer to individual functioning, including physical impairment, sensory impairment, cognitive impairment, intellectual impairment mental illness, and various types of chronic disease. Correspondingly, three dimensions of disability are recognized in the International

Classification of Functioning, Disability, and Health (ICF) such as body structure and function, activity and participation. The classification also recognizes the role of physical and social environmental factors can affect PWDs whether they can involved or not (Disabled World, 2018). The Persons with Disabilities Act 2008 (Act 685) (PWDA) defines PWDs as persons with long-term physical, mental, intellectual or sensory impairments in interaction with various obstacles that hindered them full participation in the community or public (Kaur, Leong, Yusof & Singh, 2015; Ismail et al., 2015). Furthermore, Rahim, Samad & Rahim (2014), defined PWDs as people with a physical, hearing or visual impairment or any combination thereof, which affects their mobility or their use of buildings and related amenities.

In Malaysian society, PWDs were recognized as social stigma, lack of capacity, lack of social acceptance, lack of public acceptance and social ignorance (Kaur et al., 2015). They recognized as such because they could not participate in many social functions such as social networking, sport and recreation due to some restrictions. One of the restrictions is related to the public transport stations where, the insufficient and unfriendly facilities make PWDs cannot use the facilities and restricted them from their social needs (Islam, 2015). Agreed by Soltani et al. (2012), where the access and facilities in the public transport station is designed inefficiently that leads to a limited space for the PWDs to move about. Besides, in others, public buildings, the main features that should be considered for PWDs are toilets, barrier-free access facilities such as handrails in lifts, car parking for PWDs, clear exit and signage (Hashim et al., 2012). Support by Kamarudin et al (2012), the non-compliance of the sizes of lifts and toilets also restricted PWDs to freely access and use the facilities provided. Also, other facilities for PWDs that not comply at the public transportation station are doorway, disabled parking, signage, ramp, kerb and handrail (Isa et al., 2016).

2.2 Legislations and Standards for PWDs in Malaysia

Malaysia now becoming one of the rapidly developing countries that in general development in term of technologically, services and facilities. Nevertheless, there are some group in the society incapable to carry out basic activities due to of lack of physical access (Kamarudin et al., 2012). It is a statutory requirement to ease the PWDs access and facilities in both inside and outside of buildings. Legislation is one of the most important threads that have impact the appearance of facilities for PWDs. The main legislation is the Person with Disabilities Act 2008, Building By-Laws (Amendment) 1991 (UBBL) and the standards are the Malaysian Standard Code of Practice on Access for Disabled (MS) are applied at the national level. In addition, the development and revision of this legislation and standards are one of the Malaysian's government initiative towards supporting the rights of PWDs. Even though there are legislation, statutory and guidelines are always available to be referred as a guide but it was not sufficient factor without enforcement and lack of good technical codes (Kamarudin et al., 2012).

2.3 Social Sustainability

The word 'social' was integrated late into debates on developing sustainability (Eizenberg & Jabareen, 2017). The primary challenges in social nowadays were mounting levels of evolving risk, vulnerability resulting from social polarization, rising urban poverty levels, urban conflict and violence, terrorism, natural disaster and climate change (Jabareen, 2015). Social life can be either inclusive or exclusion but when it come to the PWDs, most of it was social exclusion. It is a "multidimensional phenomenon" related to person, social, economics, socio-economic, organizational and political and other institutional. These phenomena make PWDs not capable of participating in communities because of a certain issue (Islam, 2015).

While, social sustainability defines as places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all (Eizenberg & Jabareen, 2017). It also defined as the close relationship between the neighbourhoods itself and the people living within it (Dempsey, Brown, & Bramley, 2012). Interact between PWDs and the able-bodied based on developing friendship and relationship of equal status and found that PWDs friendship with able-bodied was facilitated by mutuality and acceptance.

The important key to achieve social sustainability was to address the problems that urban communities currently face, cannot independently generate the capacities that communities require to become sustainable, social processes and structures that will emerge within a community and ensure the satisfaction of its ever-changing needs (Vallance et al., 2011). They teased, hated, negatively viewed and overly-sympathized. PWDs conceal their disabilities to protect their image of competency at work (Kaur et al., 2015). The disabilities make PWDs become more excluded from the community. They the most vulnerable exposed to the risk of social exclusion (Islam, 2015).

2.4 Relation between Disabled Facilities and Social Sustainable Issues

The incompliance facilities for PWDs can isolate them from all community and social activities (Islam, 2015). In addition, the development of social relationship is influenced by public transport and physical support (Kaur et al., 2015). Moreover, according to Jabareen (2015), social sustainability outcomes with urban planning and design principles, such as compactness, mixed-use, density, sustainable transport, and greening. Then, social sustainability is important to make sure PWDs not exclude from society but can enjoy the same facilities and freedom in life. From the literature review, the ideas came out with the research about the provision of the disabled facilities at ETS stations towards social sustainability.

3 RESEARCH METHODOLOGY

Two ETS railway stations at Perak were chosen for observation. Both of the ETS railway station located at Perak. An observation checklist was developed before conducting a document analysis on the main documents Malaysian Standard (MS) 1184:2014. The purpose of conducting the observation was to observe the compliance of the existing disabled facilities provided in the case studies. After the observation was conducted, the entire checklist was by using descriptive analysis to determine types of facilities provided and the compliance of each of the facilities provided at all stations to the standard provided.

4 FINDINGS

4.1 Types of facilities for PWDs to be provided at ETS railway stations

Figure 1 shows the range of types of facilities to be provided at the ETS railway stations. There are 10 types of disabled facilities to be provided in ETS railway stations namely designated accessible parking, path to the building, ramp, building entrance and final exits, handrail, stairs, toilet, signage, lifts and ticket offices.

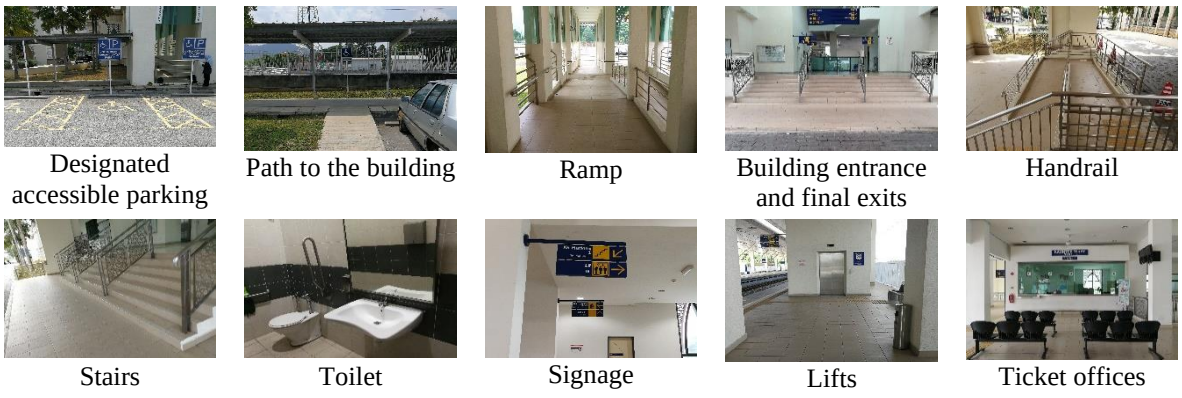

Figure 1 Types of facilities for PWDs to be provided at ETS railway station

Table 1 Availability of the facilities for PWDs in ETS railway stations in Perak

	Facilities	RS1	RS2
1	Designated accessible parking	Available	Available
2	Path to the building	Available	Available
3	Ramp	Available	Available
4	Building entrance and final exits	Available	Available
5	Handrail	Available	Available
6	Stairs	Available	Available
7	Signage	Available	Available
8	Lifts	Available	Available
9	Reception areas, counter, desks and ticket offices	Available	Available
10	Toilet	Available	Available

Note: RS (Railway Station)

Table 1 presents the availability of facilities for PWDs at chosen ETS railway stations in Perak. Majority of the facilities for PWDs are provided at both stations.

4.2 Analysis of the compliance of the facilities for PWDs provided at the ETS railway stations with the MS

Next is to look at the compliance of the facilities for PWDs at both stations. Based on the literature reviews, the most frequent incompliance facilities cited by authors are designated accessible parking, ramp, handrail, signage and lift.

4.2.1 Designated accessible parking

Table 2 Analysis of designated accessible parking towards MS

Standard	Compliance		Remarks
	RS1	RS2	
1) Location near to main entrance, should less than 50m.	√	X	RS2 far from entrance
2) Car parking minimum size 3600mm (W) x 5400mm (L).	X	X	Both RS have smaller car parking size
3) Minimum width between car is 1200mm.	X	X	RS1: 640mm RS2: 550mm
4) Designated parking spaces are clearly signed posted.	√	√	
5) Provide direction arrow combine with the international symbol of access.	√	√	
6) Parking space shall be marked both on both side and vertical sign with international symbol of accessible parking space.	√	√	
7) The kerb ramp is located near to the accessible parking area.	√	√	
8) Kerb ramps have a slip-resistant surface.	√	√	

Note: √ (Comply) X (Not comply)

There are eight standards of the designated accessible parking as shown in Table 2. Majority, both stations complied with the standard. However, RS2 not complied with the location of the parking area where the designated accessible parking placed far from the entrance. Meanwhile, both station not comply with car parking size and width between car. The size for car parking at RS1 is smaller than the standard which is 3860mm (W) x 3840mm (L) and the width between car is 640mm. For RS2, the size for car parking also smaller than the standard which is 3350mm (W) x 3990mm (L) and

550mm width between car. When the parking has a smaller size and small minimum width between the car it will make PWDs difficult to exit from the car.

4.2.2 Ramp

Table 3 Analysis of ramp towards MS

Standard	Compliance		Remarks
	RS1	RS2	
1) Width of the ramp more than 1200mm.	√	√	
2) Provide end landing at the foot and head of ramps.	√	√	
3) Length of end and intermediate landing not less than 1500mm.	√	√	
4) Handrail provided on each side of ramp exceed 800mm.	√	√	
5) Distance between handrail 1000mm.	X	X	More than 1000mm

Note: √ (Comply) X (Not comply)

Table 3 listed all five standards of ramp to comply at both stations. Both stations fulfilled the standards. However, both stations not complied with distance between handrail where the distance is more than 1000mm at both stations. Thus, the wheelchair user cannot use both of their hands to pass through the ramp. Handrails were provided at both sides of the ramp.

4.2.3 Handrail

Table 4 Analysis of handrail towards MS

Standard	Compliance		Remarks
	RS1	RS2	
1) Provide handrails for ramps, stairs and lift cars.	√	√	
2) Securely fixed and rigid.	√	√	
3) Handrail is provided at both sides of the stairs.	√	√	
4) The height of the handrail is between 850-1000mm above the surface of ramp.	√	√	
5) Braille, raised text or tactile symbol shall be unobtrusively and permanently fitted or fixed to handrails.	X	X	Do not have Braille or tactile symbol

Note: √ (Comply) X (Not comply)

Table 4 presents five standards of handrail that need to comply. Both stations complied with all handrail standards except for Braille writing. Both stations used handrails that do not have any Braille, raised text or tactile that fitted or fixed to handrails. This situation restricted the person with visual impaired to find the direction. However, others were meet the standards well. Handrails were securely fixed, rigid and its have a suitable height which is 840mm from floor for both stations.

4.2.4 Signage

Table 5 Analysis of signage towards MS

Standard	Compliance		Remarks
	RS1	RS2	
1) Well-illuminated, clear and readable sign are placed at consistent height.	√	√	
2) At the crowded situation, the signs are placed at least 2100mm high from floor.	√	√	
3) Informative sign is placed at adjacent to the entrance door and can be illuminated and clearly visible	√	NA	NA (small station)
4) Signs on panels in lifts and public toilets shall be raised tactile and include Braille.	√	√	
5) Provided small arrow for the Braille readers when an arrow is used in tactile sign.	X	X	

6) Tactile symbols applied on handrails, doors, maps or floor plans have raised relief contour similar to tactile letters.	X	X	
7) Positioning the display or the screen out of direct light	√	NA	
8) Shading the display or the screen.	√	NA	

Note: √ (Comply) X (Not comply) NA (Not available)

There are eight standards of signage as shown in Table 5. Majority, both stations comply with the standards except for 2 standards namely small arrow for Braille reader and tactile symbols. There is no small arrow for Braille readers when an arrow is used in tactile sign for both stations. Besides, handrails, doors and maps do not have any tactile symbols. Also, there were some unavailable facilities for PWDs at RS2 because it was a small station.

4.2.5 Lift

Table 6 Analysis of lift towards MS

Standard	Compliance		Remarks
	RS1	RS2	
1) For lifts with two adjacent side, the minimum inner dimensions is 1600mm x 1400mm with 900mm unobstructed door width.	√	√	
2) Handrail is provided (at least one) and fixed horizontally at the same side at the car operating panel	√	√	
3) The height of the top of handrail is 800-900mm above the floor.	√	√	
4) The internal wall material must be non-reflective, matte finish with colour contrasting with the floor.	X	X	Used reflective and non-matte finish
5) Floor of the car have similar surface characteristic to the landing.	X	X	Have different characteristic
6) The control and unique shape buttons are equipped with Braille.	√	√	
7) The device provides visual and audible feedback for passengers.	√	√	

Note: √ (Comply) X (Not comply)

Table 6 listed all seven standards of lifts to be complied at both stations. Both stations have the same standards that were complied except for 2 standards which are internal wall material and floor surface characteristic. The internal wall of the lift used reflective and non-matte finish. As the door open, passengers can see their reflections on the wall and it can make PWDs that have visual problem confused. Besides, the floor surface of the lifts and landing floor have different characteristic. Floor of the car used rubber material floor and the landing floor used tiles.

5 DISCUSSION

The findings revealed that although both ETS stations are attempting to accommodate the PWDs needs, several facilities are not complying with the MS1184:2014. The incompliance of the facilities for PWDs does affect their social sustainability where they cannot participate fully in their social life. This is in the line with Kamarudin et al., (2012) stating that the main cause that prevents the PWDs to participate in community is due to lack of access and facilities provided. In addition, the non-compliance of the sizes of lifts and toilets also restricted PWDs to freely access and use the facilities provided. Besides, the accessibility to the transportation stations can affect their social life of PWDs such as health, quality of life and well-being, social inclusion, community, safety, social and community cohesion and employment. Transportation can help them to access to activities for enhancing their life satisfaction (Jeekel, 2017).

While, promoting social cohesion and inclusion is to ensure that PWDs are hindered from unemployment, low education, poor health, low income and poor accessibility. To overcome these deprivation factors, transportation can help to access for better job, facilities and services (Atkins, 2008). Moreover, the expansion of infrastructure in this transportation can create new and more employment opportunities and thus the unemployment levels in the community will be reduced. Thus,

changes in consumption patterns, habits and social structures of society can affect transport easily (Mosaberpanah & Khales, 2013). This research has provided some guideline for planners, local authority and designers in planning and designing or improving the existing facilities for PWDs. Also the relationship between the facilities for PWDs and the social sustainability of PWDs. This is critically important so that the PWDs can participating in the community and will promoting their social sustainability.

6 CONCLUSIONS

This research would suggestively to promote and enhance the ETS railway stations for better value by focusing on the friendly facilities for PWDs. The social sustainability of PWDs of accessible to the community only can be achieved if the facilities that provided comply with the MS. PWDs need to be independent to improve their capability in participation in the community. By having good facilities for PWDs it will make this group interested in using these services that make them participating in community and live their life as easier as normal people. Moreover, it also encourages the friendly atmosphere of the ETS railway stations for PWDs. Finally, in improving or designing better public transport stations, feedback from the users is the highest importance. There are also needs for further innovative and friendly design to construct a barrier-free environment and infrastructure.

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