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Evaluation Level of Accessibility on Malioboro Pedestrian Way for People with Disabilities

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Abstract. One of the way to support equality of rights for people with disabilities can be realized by providing accessibility to pedestrian way. Malioboro as the most popular tourists destination in Yogyakarta have been arrangements to create pedestrian way that is pedestrians friendly, including people with disabilities. The aim of this study is to evaluate the facilities and accessibility of the Malioboro pedestrian way for people with disabilities based on the Indonesian government regulations. The research reveals that some factors influence the level of accessibility on the pedestrian way, namely pedestrian lane, guiding block, parking lot, ramp, zebra cross, bus stop, worship place, toilet, sign and marker. People with disabilities that accept the least to the most conditions in the field from the total requirements of 44 facilities and accessibility, they are blind (29), disabled (34), wheelchair user (35), deaf (37), children and elderly (39). Then, the smallest level of accessibility was obtained the guiding block 50% with sufficient category and the greatest level of accessibility was obtained the pedestrian way (west side), zebra cross and worship place 100% with very good category. Overall, the Malioboro pedestrian way is the good category with accessibility level of 79.7%. It was found that the blind needs a lot of facility improvements, such as changing the guiding block using materials and colours that are according to the standard (yellow), installing signage using braille, and change notification information visually and audio. In addition, improving pedestrian way can also be done by arranging street vendors around Malioboro that are according to standards, providing special toilets for people with disabilities, add of benches at the bus stop, add of trees and canopy seats on the west side.

Keywords: pedestrian way, accessibility, facility, disabilities

1. Introduction

The Government of Yogyakarta City make efforts to arrangement, in order to build a city that is comfortable for public. Arrangement of pedestrian way at various strategic points is one of the main focuses at this time. The pedestrian area which has become an icon of Yogyakarta, that is the Malioboro area, is famous as the center of various activities, such as government, tourism, commercial, services, and culture. This results in high public interest in visiting, especially during weekends and holiday seasons. This creates a sense of discomfort for pedestrians, especially people with disabilities, because the space for movement is limited when passing by other visitors.

Previously, Nasution et al. [1] conducted an analysis of pedestrian facilities in the Malioboro area, by means of observations and questionnaires in the field. The results of the analysis show that most of the facilities meet the standards in terms of design, but are not sufficient in terms of availability and function for pedestrians in general.

Equal rights so that people with disabilities can live independently and participate fully in aspects of life can be realized by providing accessibility. In realizing accessibility for people with disabilities, it can take the form of physical or non-physical. Accessibility in physical form can be done by providing facilities on pedestrian way. As for non-physical accessibility, it can be done by not closing the opportunity for people with disabilities to get their rights and obligations. This research tries to investigate the availability and convenience of Malioboro pedestrian way facilities, specifically for people with disabilities.

2. Literature Review

Kim et al. [2] conducted research in Waikiki (one of the place that dependent on tourism and visitor arrivals) and try to analyse the impact of 14 different types of street furniture in order to develop a method for evaluating level of service. Two kinds of street furniture, namely fixed items (planter box, phone tree, water fountain, etc.) and movable items (bench, coffee cart, vending cart, table/chairs), were considered. The number of interaction between street furniture and pedestrian was measured (use rates or accessibility), as well. The impact is greatest for coffee carts and vending carts (movable items) which both show decreases in LOS measured relating to area per pedestrian and flow rate. The dimension and use rates are considered giving the greatest impact in decreasing sidewalk performance. Regarding dimension should be evaluated about the impact of these various kinds of fixed and movable street furniture on the mobility and safety for person with disabilities.

Sisiopiku and Akin [3] investigated pedestrian behaviours and perceptions towards various pedestrian facilities. Pedestrian facilities considered in the research are intersection crosswalk, un-signalized marked and non-striped midblock crosswalk, physical barriers (vegetation and two foots high concrete wall), midblock crosswalk shelters, coloured paving at medians and curb, and pedestrian warning signs at midblock crossing locations. It was revealed that un-signalized midblock crosswalk showed high crossing compliance rate of pedestrian, and crosswalk location was the most important factor to decide location to cross at a designated location.

3. Methodology

2.1 Study Design

The research location on the east and west sides of the Malioboro pedestrian way and the Abu Bakar Ali Parking Special Place, Yogyakarta. Data collection are conducted on 13 and 18 February 2020. The research locations can be seen in Figure 1 and Figure 2.

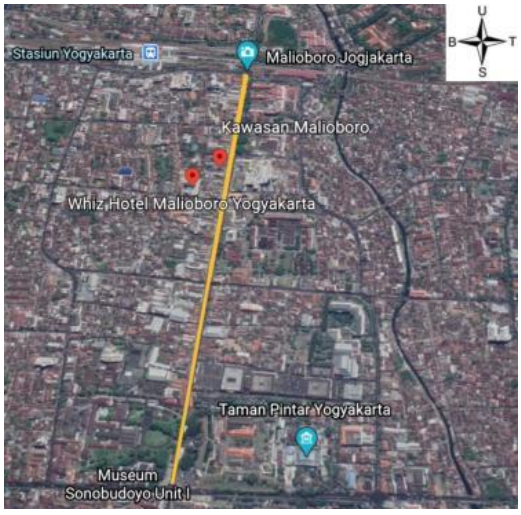

Figure 1. Malioboro pedestrian way

Figure 2. Abu Bakar Ali's special parking areas

2.2 Data Collection

The data obtained in the form of primary and secondary data. Primary data was collected by direct observation, in the form of conditions and documentation of facilities and accessibility at the research site. Secondary data in the form of a map of the research location obtained from google earth as well as technical requirements and accessibility for people with disabilities based on the Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia No. 30/PRT/M/2006 [4] and Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia No. 14/PRT/M/2017 [5] concerning Requirements for Ease of Building and Environment. The variables used include pedestrian ways, guide lanes, parking lots, ramps, zebra crossings, bus stops, marking signs, places of worship and toilets.

2.3 Technical Data Analysis

Analysis of facilities and accessibility of pedestrian ways is carried out by comparing primary and secondary data, then each variable will be classified into 3 parts, namely there are and appropriate to get 2 points, there are but not appropriate to get 1 point, and none get 0 points. Furthermore, an evaluation of the level of accessibility of the Malioboro pedestrian way was carried out. The level of accessibility is the ratio between the amount of accessibility can be accepted and total accessibility required for each variable. The following is an assessment of accessibility and the range of accessibility levels in percent as shown in Table 1 and Table 2.

Table 1. Accessibility assessment

Number	Accessibility Conditions in the Field	Score
1	Yes (appropriate)	2
2	Yes (not appropriate)	1
3	None	0

Table 2. Accessibility level range

Nimber	*Range* Accessibility Level (%)	Description
1	81–100	Very good
2	61–80	Good
3	41–60	Enough
4	21–40	Bad
5	0–20	Very bad

Diani [6] stated that each person with disabilities has different accessibility needs, so an analysis is carried out by providing a checklist for each person with disabilities who can accept accessibility conditions in the field. Next, add up the acceptable requirements for each person with disabilities.

4. Facility and accessibility analysis based on regulation

The assessment is carried out by comparing the facilities and accessibility of pedestrian ways with the Regulation of the Minister of Public Works No. 30/PRT/M/2006 and Regulation of the Minister of Public Works for Public Housing of the Republic of Indonesia No. 14/PRT/M/2017 concerning Technical Guidelines for Facilities and Accessibility in Buildings and the Environment. The following is an analysis of the facilities and accessibility of each variable.

3.1. Pedestrian Way

The pedestrian way is made into 2 analyses, namely the east and west sides, there are 5 components that are used in terms of accessibility. Score for east side is 9 with a width of 10–12 m, making it very easy for people with disabilities to move freely without worrying about colliding with other visitors. Overall, the surface of pedestrian way is safe to use because the condition of the floor surface is quite stable, strong, not wavy and not slippery. Placement of street furniture in a safe location and does not interfere with pedestrian activities, but there are still street vendors who violate the rules by using pedestrian way at several points to sell using carts or stands, so that the width of the pedestrian way that should be passed by pedestrians becomes reduce.

The score of west side pedestrian way is 10 points, with a smaller width than the east side, which is 9 m, but visitors can move freely. The surface of the pedestrian way is quite stable, strong, not bumpy and not slippery at all locations. In addition, the placement of street furniture does not interfere with the comfort and safety of people with disabilities, and street vendors have used the places provided by the government to sell. The availability of seats is very adequate, with a distance of every 200 cm visitors can find seating facilities.

(a) (b)

Figure 3. Pedestrian way, east side (a), west side (b)

3.2. Guide Line

Four components are used in the guideline accessibility requirements, and it get 4 points for scoring. Overall, the Malioboro area is equipped with guide lanes with stripes and round patterns, making it easier for people with disabilities, especially the blind. However, many of the warehouse blocks were damaged due to the hectic activity and frequent passing of street vendor carts and bicycles. The use of guiding block color is more dominant in silver than yellow which is only installed at certain points.

Figure 4. Guiding lane

3.3. Parking lot

Three components are used in terms of parking lot accessibility and it get 4 points. The closest distance needed from the Abu Bakar Ali Parking Special to the nearest Malioboro area, namely Hotel Inna Garuda Area, is 102 meters. This condition was not followed by the presence of special symbols for people with disabilities to facilitate accessibility, only symbols of orders, instructions, and prohibitions were found. The parking lot has sufficient area for people with disabilities, especially wheelchair users, to move safely and comfortably.

Figure 5. Abu Bakar Ali parking lots

3.4. Ramp

Four components are used in the accessibility requirements of the ramp and the score is 7. The condition of the ramp has a slope of 7º and a ramp width of 100 cm without a safety edge, the condition of the ramp surface is not slippery, stable, strong and textured, but the condition of the end of the ramp is quite sharp which has the potential to be dangerous visitors. The ramp is equipped with the availability of sufficient lighting at every point.

Figure 6. Ramp condition

3.5. Zebra Cross

Three components are used in the zebra cross accessibility requirements, it get 6 points. In Malioboro area, zebra crossings are available at several points to provide safety for pedestrians. A button to cross that is equipped with sound and visual is already available in the area, so that people with disabilities can move independently. At the end of the crossing area, both on the east and west sides, there are ramps.

Figure 7. Zebra cross

3.6. Bus Stop

Three bus stops exist in Malioboro, then called Bus Stop 1, Bus Stop 2, and Bus Stop 3. There are 3 components used in terms of accessibility. Bus Stop 1 located in front of the Inna Garuda Area Hotel got 4 points, where the condition of the stop is that stairs and ramp facilities are equipped with handrails. Notification of information is still manually using the help of the bus stop staff. The availability of seats is not proportional to the number of Trans Jogja users, there is only 1 seat with a capacity of 3 people, so many prospective passengers are standing while waiting for the arrival of Trans Jogja.

Bus Stop 2 located in front of Mutiara Hotel got 5 points, the availability of stairs and ramp facilities that are equipped with handrails, making it easier for people with disabilities to access the bus stop independently or with the help of others. Bus stop officers are available to provide information on routes, bus arrivals and manually purchase Trans Jogja tickets. The availability of seats is more than the Bus Stop 1, which is 3 seats with a capacity of 9 people.

Bus Stop 3 located in front of the Vredeburg Fort Museum got 5 points, the condition of the bus stop is that there are stairs and ramps equipped with handrails that make it easier for people with disabilities, especially wheelchair users or people who push the wheelchair to access the entrance and exit of the bus stop. Providing information on arrivals, routes and purchasing Trans Jogja tickets, assisted by bus stop officers, for the availability of very adequate seats, namely 4 seats with a capacity of 12 people.

(a) (b) (c)

Figure 8. Bus stop 1 (a), bus stop 2 (b), and bus stop 3 (c)

3.7. Signs and Markings

Three components are used in terms of accessibility of signs and markings, with 4 points of scoring. There are no signs and markings in braille that are specifically for the disabled. The signs available at these locations in the form of prohibition signs, command signs, and general guidance signs in locations that are free of sight without any barriers and have used international symbols, so that they are easily understood by local and foreign tourists when visiting. However, there are some signs that are starting to fade, making it difficult to read in long distances.

Figure 9. Sign and marking

3.8. Worship place

Four components are used in terms of accessibility of places of worship, it gets 8 points. The availability of places of worship in this area is quite good and the location is strategic. Places of worship for men and women are separate, equipped with adequate worship facilities. The condition of the ablution place both in terms of lighting and floor texture is quite good, namely lighting from sunlight during the day and lighting at night and the floor texture is not slippery, so it does not interfere with worship activities.

Figure 10. Worship place

3.9. Toilet

Four components are used in the accessibility requirements of public toilets, it get 5 points. Throughout the survey area, only toilets for the general public were found, there were no special toilets for people with disabilities. The toilet measures 175 cm x 250 cm with a door that can be opened both inside and out. The handrail that serves to facilitate movement of the disabled in the room is only found in one toilet cubicle.

Figure 11. Toilet

5. Accessibility analysis for each people with disabilities

Kurniawan et al. [7], states that based on physical and mental abilities that are different from most people, people with disabilities are divided into several groups based on their respective characteristics. The analysis was carried out on groups of disabled users of wheelchairs, deaf, blind, quadriplegic, children, and the elderly. The number of accessibility that can be accepted by wheelchair users is 35 components, the deaf are 37 components, the blind are 29 components, the physically disabled are 34 components, the children are 39 components, and the elderly are 39 components. These are listed in Table 3.

Table 3. Amount of accessibility acceptable for each people with disabilities

#	Variables	Number of Item*	Acceptable Components					
			User Wheel chair	Deaf	Blind	Quadriplegic	Children	Elderly
1	Pedestrian way (east side)	5	4	5	4	4	5	5
	Pedestrian way (west side)	5	5	5	5	5	5	5
2	Guide line	4	1	4	0	1	4	4
3	Parking lot	3	1	2	1	1	2	2
4	Ramp	4	3	3	3	3	3	3
5	Zebra cross	3	3	3	3	3	3	3
6	Malioboro bus stop 1	3	3	1	1	2	2	2
	Malioboro bus stop 2	3	3	2	2	3	3	3
	Malioboro bus stop 3	3	3	2	2	3	3	3
7	Signs and markings	3	3	2	2	3	3	3
8	Worship place	4	4	4	4	4	4	4
9	Public toilet	4	2	4	2	2	2	2
	Amount		35	37	29	34	39	39

Note: Item are some factors founded related to disable facilities in each variable based on Regulation of the Minister of Public Works No. 30/PRT/M/2006

6. Evaluation of facilities and accessibility pedestrian ways

The level of accessibility obtained by the east side pedestrian way is 90% (very good category), the west side pedestrian way is 100% (very good category), guide line is 50% (enough), parking lot is 66.7% (good category) , ramp is 87.5% (very good category), zebra crossing is 100% (very good category), Malioboro bus stop 1 is 66.7% (good category), Malioboro bus stop 2 is 83.3% (very good category) , Malioboro bus stop is 83.3% (very good category), signs and markers is 66.7% (good category), worship place is 100% (very good category), public toilets is 62.5% (good category). Furthermore, from the 9

variables used, the resulting Malioboro pedestrian way accessibility level is 79.7% with a good category, can be seen from the following calculations and Table 4.

$$\text{Accessibility Level of Pedestrian Way} = \frac{\text{Total Accessibility Level (\%)}}{\text{Total ped. way Components}}$$
$$= \frac{(90+100+50+66.7+87.5+100+66.7+83.3+83.3+66.7+100+62.5)\%}{12}$$
$$= 79.7\% \text{ (Good)}$$

Table 4. Accessibility level of each variable

Variables	Accessibility Score	Total Score	Total Components	Accessibility Rate (%)	Description
Pedestrian way (east side)	Appropriate = 8	9	5 * 2 = 10	90%	Very good
(5 items)	Not appropriate = 1				
	None = 0				
Pedestrian way (west side)	Appropriate = 10	10	5 * 2 = 10	100%	Very good
(5 items)	Not appropriate = 0				
	None = 0				
Guide line	Appropriate = 0	4	4 * 2 = 8	50%	Enough
(4 items)	Not appropriate = 4				
	None = 0				
Parking lot	Appropriate = 2	4	3 * 2 = 6	66.70%	Good
(3 items)	Not appropriate = 2				
	None = 0				
Ramp	Appropriate = 6	7	4 * 2 = 8	87.50%	Very good
(4 items)	Not appropriate = 1				
	None = 0				
Zebra cross	Appropriate = 6	6	3 * 2 = 6	100%	Very good
(3 items)	Not appropriate = 0				
	None = 0				
Malioboro bus stop 1	Appropriate = 2	4	3 * 2 = 6	66.70%	Good
(3 items)	Not appropriate = 2				
	None = 0				
Malioboro bus stop 2	Fit = 4	5	3 * 2 = 6	83.30%	Very good
(3 items)	Not appropriate = 1				
	None = 0				
Malioboro bus stop 3	Appropriate = 4	5	3 * 2 = 6	83.30%	Very good
(3 items)	Not Appropriate = 1				
	None = 0				
Signs and markings	Appropriate = 4	4	3 * 2 = 6	66.70%	Good
(3 items)	Not appropriate = 0				
	None = 0				
Worship place	Appropriate = 8	8	4 * 2 = 8	100%	Very good
(4 items)	Not appropriate = 0				
	None = 0				
Toilet	Appropriate = 4	5	4 * 2 = 8	62.50%	Good
(4 items)	Not appropriate = 0				
	None = 0				

7. Discussion and conclusion

Generally, the results of the study reveal that accessibility of the facilities around the sidewalk is in good category. The rating of almost all of the items have good or better category. Only guide line condition falls in enough rate because of some material of guiding block found broken in some spots along the sidewalk. Most of the variables get good/very good rate show that the pedestrian facilities in Malioboro street well accommodate to disabled people. Kim et al. [2] revealed that the dimension of the facilities should be given more attention regarding mobility of disabled person. In this case, the variables of pedestrian lane, ramps, zebra cross, bus stops have very good rate, even toilet get good category.

The results of the study reveal that the standard level of accessibility of pedestrian way is influenced by several factors, namely pedestrian ways, guide lines, parking lots, ramps, zebra crossings, bus stops, worship places, toilets, appropriate signs and markings in terms of design, availability, and no obstacles. Based on a total of 44 facilities and accessibility requirements used, the disabled groups accept the conditions in the field they are blind (29), quadriplegic (34), wheelchair users (35), deaf (37), children and the elderly (39). The lowest level of accessibility was obtained by a guide line of 50% (enough category) and the highest level of accessibility is obtained by pedestrian way (west side), zebra cross and worship place by 100% (very good category). Overall, of all the variables used, the results of the evaluation of the Malioboro pedestrian way are in good category with an accessibility level of 79.7%. Street Vendors became obstacles because of decreasing effective width of pedestrian way and causing potential to interfere with the activities of people with disabilities. In addition, the availability of signs and markings that use braille has not been realized.

8. References

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