Walkabilty Study on Pedestrian Path in the Rawamangun Velodrome Area, East Jakarta

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Abstract Pedestrian paths in the Rawamangun Velodrome area have been built since the start of the 2018 Asian Games, but the results of observations of the use of pedestrian paths are still low in user traffic. This writing aims to identify the walkability index and pedestrian facilities based on pedestrian service standards. This study used the mixed method for investigating the pedestrian path facilities, pedestrians volume by and the width of the pedestrian path in each observation segment. The walkability index was measured by using the formula and theory of the global walkability index. The value of the global pedestrian index analysis was recorded as 57.63, which means that some facilities around the pedestrian path (sidewalk) can be reached or passed on foot, but the fact is that there are frequent conflicts between pedestrians and motorcycle parking lots and street vendors. The finding of this study could be used for policy evaluation of the walkable area of Velodrome Rawamangun.

1 Introduction

The ever-increasing population growth will affect the city's transportation facilities and infrastructure. This causes transportation facilities to be able to serve all components of road users from four-wheeled vehicles such as cars, two-wheelers such as motorcycles and bicycles as well as pedestrians [1–4]. Walking is the main mode of transportation for most people, especially metropolitans in the world [2, 5, 6]. For a big city like DKI Jakarta that experiences daily traffic jams due to the lacking of efficient transportation management and policies, this problem results in an increased risk of environmental, economic and health issues. The revitalization of pedestrian paths or sidewalk has begun to be improved since the 2016 Fiscal year. The DKI Jakarta Regional Government since 2016 has had a pedestrian path revitalization

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program with a target of 134 km sidewalks from 2017 to 2019. It is hoped that the sidewalk construction to integrate public transportation in the city of Jakarta is in line with the Governor's Instruction Number 66 of 2019 [7] regarding Jakarta's air quality control. Pedestrian users in Jakarta were encouraged to do more walking activities and use public transportation more often, in work activities, or in sports.

This study investigates the Rawamangun Velodrome area of Pulogadung sub-district in East Jakarta as the study area. This area consists of commercial areas, office areas, settlements, and leisure and sports areas. Priority has been given to the construction and construction of pedestrian path from the fiscal year of 2016 to 2018 due to the serving the purpose of hosting the 2018 Asian Games, as this area provides the bicycle racing division.

This paper aims to evaluate and analyze the walkability index of the study area, by using the Global Walkability Index (GWI) parameters, and whether the study area met pedestrian service standards in accordance with the Regulation of the Minister of Public Works No. 3/PRT/M/2014 dated 26 February 2014, concerning Planning, Provision and Utilization of Pedestrian Network Infrastructure and Facilities in Urban Areas.

2 Literature Review

Walkability is a comprehensive assessment of all aspects of the activity and walking path environment. Walkability can also be used to reflect the conditions and feasibility of walking in an area. The basic theory of walkability assessment procedures can provide an overview and assess connectivity or connectedness, the quality of sidewalks, footpaths, in cities [8–11]. Various methods for assessing the walkability index have been developed in ranges of developed and developing country. The walkability assessment method is generally carried out using two study approaches, namely subjective and objective [9–13]. The available data can be further classified into qualitative and quantitative data.

However, the walkability assessment methods that have been developed in various developed countries cannot be simply applied in Indonesia because these methods are developed based on conditions and needs that are not necessarily appropriate to the situation in Jakarta or Indonesia. This has an impact on the level of reliability and relevance. Therefore, of the various methods currently available, only the method that uses an objective approach and combines quantitative–qualitative data that can be applied in the assessment of walkability in urban areas of Indonesia.

3 Methods

The research method of the Global Walkability Index, conducted and improvised by Holly Virginia Kreambeck for the World Bank [9], describes a qualitative assessment

and analysis of the condition, environmental comfort of pedestrian paths, their safety and security [10].

This research will conduct a walkability assessment. The method of obtaining the walkability index has eleven parameters. Parameter observations will be carried out by assessing pedestrian conflicts with motorized vehicles or cyclists, parameters of availability and cleanliness of pedestrian paths, availability and safety of crossings, parameters of motorized vehicle behavior, availability of supporting facilities for groups of people with disabilities, security parameters from criminal acts.

To obtain data and facts in the field, the author will use the observation method, by taking photos of the observation area and also taking notes to get a general picture of the observation area. Assessment is carried out with a score of 1 to 5 (1 is the lowest score and 5 is the highest score).

This method includes the number of pedestrians from the calculation of the pedestrian flow for 15 min, as well as in this research, because the authors want to know the number of sidewalk users in a matter of every fifteen minutes in one observation.

The Ministry of Public Works has issued a guide to the planning procedures for the development of pedestrian facilities, which can be used as a reference for planning and evaluating sidewalk facilities, especially in urban areas in Indonesia [14, 15]. The pedestrian service standards contained in these guidelines are technical and universal and adapt to existing environmental conditions. Standards for sidewalk space can be formulated and used according to the types of pedestrian sections and considering local habits and types of activities.

After all the data is collected, then it is calculated and analyzed to get the value of the walkability index as developed by the results of previous studies. For ease of calculation, the value of the assessment score is converted in the range of values 0–100. The assessment is carried out with a score of 0–24 to 90–100 (0–24 is the lowest score, and the 90–100 is the highest score).

After calculating the walkability index, the pedestrian flow was calculated based on the total number of pedestrians passing through the observed segment using the technical guidelines of the Ministry of PUPR (Minister of Public Works 2014). Observations were made during peak hours with 15-min intervals. The results are compiled every 15-min intervals and the total number of pedestrians is calculated and adjusted into units, with the following formula: Pedestrian Flow = ((pedestrians/m)/minute).

4 Results Discussion

The results of the overall parameters and observation points produce an average value of 57.63 which means that according to Table 1, several facilities around the pedestrian path (sidewalk) can be reached or passed on foot. The walkability assessment per parameter for each observation point and segment is shown in Table 1.

The highest walkability value for all segments is obtained in parameter six, namely supporting facilities or amenities (62.70), whereas the lowest value is in parameter

Table 1 The results of the calculation of walkability index at 9 observation points

No	Parameter assessment	Observation point									WI Score
		I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	
1	Pedestrian Conflict with Other Transportation	4	4	3	4	5	4	4	5	5	60.00
2	Availability of Pedestrian Paths (With Maintenance And Cleaning)	4	4.5	3.5	4	5	4	4	5	5	60.66
3	Crossing Availability	4	4	3	3	4	3	3	4	4	51.13
4	Crossing Safety	4	4	3.5	3.5	4	2	4	4	4	52.42
5	Motorcyclist Behavior	4	4	4	4	4	3	4	5	5	59.51
6	Supporting Facilities (Amenities)	5	5	4	3	4	3	4	5	5	62.70
7	Infrastructure for People with Disabilities	4	4	3	3	5	3	3	5	5	57.66
8	Barrier or Obstacle	4.5	4	3.5	3.5	5	3.5	4	5	5	61.21
9	Security From Crime	4	5	4	3	4	3	4	4	4	53.43
10	Number of Pedestrians (within 15 min)	57	38	36	43	36	33	38	62	72	
11	Length of Pedestrians observation	0.52	0.2	0.1	0.2	0.1	0.1	0.2	0.2	0.52	
The average of WI Score											**57.63**

three, namely the availability of crossings (51.13). Related to the results of the walkability index, that the results of observations for all segments and observation points score between 4 and 5, there is indeed a score of 3, but this is an assessment in certain segments, supporting facilities available; blind tile guides, park benches, motor barrier poles (bollard), night lights, trash cans, and the availability of reforestation lanes, as well as some segments providing manholes (needs for installing PLN utilities, PAM, internet cables.) PJU lights), and the average sidewalk width is above 2.5 m' according to the 2014 PUPR Ministerial Regulation as a minimum standard of 2 m' for residential areas, offices, shops, recreation, bus terminals and schools.

As the lowest score for the availability of crossing parameters, because in field observations, zebra cross signs are only found at red light intersections, while the farthest distance for zebra crossings is an average of 200 m' which causes many pedestrians to cross spontaneously or carelessly. Actually, this does not need to happen, because technically the placement of a zebra cross or crossing sign and bus shelter facilities have been placed according to the 2014 PUPR Ministerial Regulation which is a minimum of 300 m', it is up to road users whether they are aware of safety in crossing or ignore it.

5 Conclusions

This study highlights that the walkability index of the Velodrome Rawamangun was indicated as the average level of the road section, the total walkability index at the observation point was reported as 57.63. The results show that several facilities around the pedestrian path of the Velodrome Rawamangun can be reached and traversed. This study also pinpoints the availability of supporting facilities (amenities) was seen as the strength of the area, which claimed by the DKI Regional Government as pedestrians 'friendly' place by providing blind guide tiles, bollards, park benches, streetlights, bus shelters and greening lanes. Meanwhile, for the criteria of the service standard, was recorded as the standard A or the pedestrian flow was not too congested, only <6.7 people/meter/minute.

The assessment of the walkability index in this study limits the study on the overview of the quality of pedestrian facilities in and around the Rawamangun Velodrome area. The expected improvement is suggested to increase the number and awareness of pedestrians using lanes to reach each desired facility, without being destructed by external factors such as crowds of drivers and parking lots, or illegal hawkers especially during off hours. Pedestrians and other users expected to socially utilize the spaces to maximize the use of sidewalks and the walkable environment.

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