Analysis of Pedestrian Planning in the City of Medan

Irma Novrianty Nasution[1], Syahreza Alvan[2], Meuthia Fadila[3]

{ irmanasution@unimed.ac.id[1], syahrezaalvan@unimed.ac.id[2], meuthiaff@gmail.com }

Building Engineering Education Department, Universitas Negeri Medan[1,2,3]

Abstract. The rapid urbanization and population growth in cities have led to an increase in the number of pedestrians, making pedestrian planning a critical aspect of urban development. This study aims to analyze the pedestrian planning strategies implemented in the city of Medan, Indonesia. The analysis begins by examining the current pedestrian infrastructure and its adequacy to meet the needs of pedestrians in terms of safety, accessibility, and comfort. Various factors, such as sidewalk conditions, crosswalks, pedestrian signals, and street furniture, are evaluated to assess the overall quality of the pedestrian environment. The study also investigates the effectiveness of existing pedestrian planning policies and their alignment with international standards and best practices. It identifies any gaps or deficiencies in the current planning approach and provides recommendations for improvement. Furthermore, public opinion and stakeholder perspectives on pedestrian planning are considered through surveys and interviews to gain a comprehensive understanding of the challenges and opportunities faced by pedestrians in the city. Additionally, the analysis takes into account the influence of land use patterns, transportation systems, and urban design on pedestrian planning. It examines how these factors contribute to pedestrian connectivity, walkability, and overall urban livability. Furthermore, the study explores potential strategies and innovative interventions that can enhance pedestrian safety and convenience. The findings of this analysis will contribute to evidence-based decision-making for future pedestrian planning initiatives in the city of Medan. It will provide valuable insights for urban planners, policymakers, and stakeholders to create a more pedestrian-friendly city environment. The results can be used to develop comprehensive and sustainable strategies that prioritize the needs of pedestrians, improve connectivity, and promote active modes of transportation.

Keywords: pedestrian planning, urban development, Medan, infrastructure, walkability, safety, accessibility, urban design.

1 Introduction

A city is an area that always grows through planning or without planning. [1] The urban problems in Indonesia are related to the increasing need for urban activities that are not offset by the compatibility of urban spatial arrangements, resulting in a decrease in the quality of the environment. [2] One of the problems of the city is the increase in the number of buildings that violate the regulations so that it can reduce other functions such as pedestrians, dense vehicle circulation, and the shift in the function of pedestrians as motor vehicle lanes. This

ICIESC 2023, October 24, Medan, Indonesia

DOI 10.4108/eai.24-10-2023.2342324

shift leads to inconvenience for pedestrians and results in less humane and friendly urban spaces as well as unlivable cities. According to a Stanford University study, Indonesians have an average walking rate of 3,513 steps per day. [3] Factors affecting, among other things, inadequate pedestrian routes (small, hollow, not meeting standards, inappropriate material selection) are taken over by other functions and do not reach the entire city territory. [4] There are four important factors that are taken into account and affect the length and distance of people walking, time, comfort, the availability of motor vehicles, and patterns of land use. [5] The main consideration for pedestrians is the existence of a balance of interaction between pedestrian and vehicle, safety factors, sufficient space for walking, facilities that offer pleasure throughout the pedestrian area, and the availability of public facilities that unite and serve as a supportive element. [6]

Pedestrian lanes in the area of Medan are a mode of transportation for pedestrians. The pedestrian condition of the city of Medan is very worrying due to the inadequate system of line arrangement. The minimum size of pedestrians characterizes it and does not comply with the applicable standards; pedestrian displacement without considering the aesthetic values and functions; pedestrian-obstructed pedestrian facilities (advertising boards, electric poles, pots of plants, trees, etc.); no available special tracks for disabled users; the presence of wild five-foot merchants along the pedestrian; even wild parking of motorcycles. The pedestrian is a special path for pedestrians and should be planned to make pedestrians feel safe and comfortable in their activities, as pedestrians have the right to carry out their activities within the city. The layout of pedestrian lanes in the area of the city of Medan is currently very interesting to study because of many problems in its planning and implementation.

2 Methodology

The scope of this research includes *Pangeran Diponegoro* and *Jenderal Sudirman* Street. This location is considered important as the face of the Field City and should be carefully considered in its layout. Research activities are carried out through live observations, user interviews, and literary studies of cases and similar theories. The research approach is qualitatively exploratory to reveal extensively and in-depth the causes and things that influence the occurrence of something. [7] The data collected is processed and described analytically and descriptively. Determining variables to facilitate the search for field data include tracks, facilities, accessibility, design results, and security facilities.

3 Literature

3.1 City Area Pedestrian

The simplest active movement to support transportation inside the city is walking. Walking requires a container of space called a pedestrian trail. Pedestrian comes from the Greek pedos, which means walking. Pedestrian can also be defined as the movement, circulation, or movement of human beings from one point of origin to another as a goal by walking. Walking is more than just a linear move from one place to another. Walkers can stop to change direction, manoeuvre, accelerate steps, slow steps, or switch to other activities like sitting,

running, lying, or dancing. More than just transportation, walking captures life in the city; as Jan Gehl said, "life happens on foot". [9]

3.2 Definitions and Pedestrian Track Requirements

In urban space planning, pedestrian trails are a very important element. Contextually, space for pedestrians plays a role in creating a humane environment for moving from one place to another on foot. The beginnings of the pedestrian route are known since the year 6000 BC in Chirochitia, Cyprus, which is a rocky street with an elevated surface from the ground, and at each given interval a ramp is given to lead to the housing group on both sides. [10] The pedestrian lane is an outdoor space used for the daily activities of city residents. For example, for walking activities that get tiring, sitting relaxed can also be a place for campaigns, official ceremonies, and trade.

A pedestrian is defined as the movement, circulation, or movement of a person from one point of origin to another as a destination by walking. Pedestrians in developed countries are an attractive area for social activity, spiritual development, and a meeting point for a group of people to just hang out. A good pedestrian trail is able to accommodate the activity of pedestrians safely, comfortably, cleanly, and without exhaustion. In determining a pedestrian trail that can accommodate every pedestrian activity, it requires technical requirements, the category of the pedestrian and its activity, as well as creating nodes that are attractive to the pedestrian.

4 Results

4.1 Characteristics of Pedestrian Users in Medan City

Medan City is one of the largest centres of social, cultural, and economic activity outside of Java Island. Heterogeneous communities of different tribes have a strong influence on the social and cultural life that develops in Medan City. This is reinforced by the characteristics of a city society characterized by a very striking social disparity in terms of education, power, wealth, achievement, and so on. Besides less familiar social interactions and caring for the environment, attachment to very small traditions, heterogeneous urban citizens, dynamic urban life with rapid development, open and critical societies, and having complete infrastructure and living facilities, these characteristics form the characteristics of urban communities: (a) anonymity: as a result of this heterogeneity, urban residents tend to be active and gather anonymously based on different races, ethnicities, beliefs, jobs, and social classes; (b) social distance: physically living in crowds, but the reality of life is distant; (c) regularity: urban life tends to be governed by rational legal norms; (d) crowds: high density and level of activity; emerging crowd centers of a temporary nature (not permanent); (e) urban personality: city life creates a personality that is materialistic, interest-oriented, independent, impersonal, hasty, shallow social interactions, manipulative, insecure (with a sense of insecurity), and personal disorganization. [11]

The transportation infrastructure in the city of Medan can be said to be inadequate physically, functionally, and in terms of utilization. The problem of means and means of transport, both for motor vehicles and pedestrians, is indicated by the condition of the urban roads, which are damaged, narrow, and not in accordance with the design provisions and technical

requirements of planning. Planning is not well considered as a social space capable of attracting a whole layer of citizens to voluntary social interaction. The behaviour of the field citizens in responding to pedestrian planning is influenced by the conditions of available facilities, such as narrow lanes blocked by crop tubs, unavailable platforms for pedestrians at intersections and street streets, the non-availability of crossing lights at the zebra crossing, and lanes filled with a variety of facilities that interfere with walking activity.

4.2 Findings at *Pangeran Diponegoro* Street

Based on observations along the line (left-right), we found facilities such as garbage cans, lights, benches, bollards, and traffic barriers. Figure 1 shows an existing path layout. The distance measurement of lights and lighting, as well as the suspension of benches and garbage cans, do not meet the applicable standards. The distances are too close, and the tracks seem too dense. The area includes major roads with high traffic levels and vehicle speeds, so it is necessary to consider the appropriate movement of pedestrian elements to accommodate the conditions. The track width varies from 3.6 m to 5.03 m. The track height is 22 cm. The fence is open and closed. The attractions of the area are parks, shopping malls, and worship houses. The main and secondary roads are non-continuous, while in the secondary road areas, there are still centres of public activity. Therefore, it is necessary to consider paths for pedestrians to continue in this area.

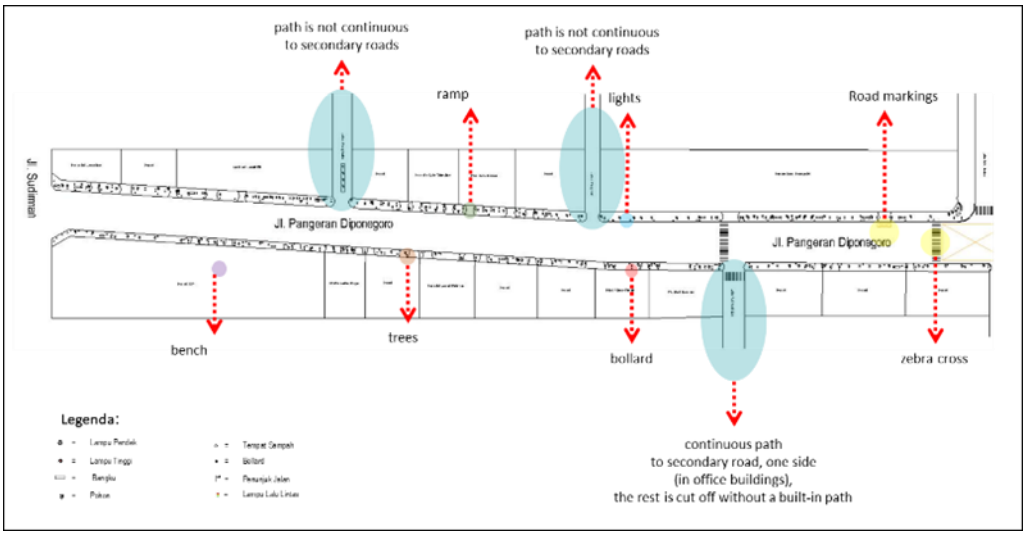

Fig. 1. The observation location of the *R.A. Kartini-Jenderal Sudirman* Street intersection.

From the findings, summarized conclusions were drawn against findings associated with variables that had been determined at the beginning of the study. A further explanation of survival can be seen in Table 1 below.

Table 1. Results based on research variables.

Variables	Findings
Track Completeness	**Track dimension:** ○ The dimensions of the tracks vary greatly, as does the height of the track. ○ There is a small pedestrian space due to the occupation of land by the building owners.  **Guiding block:** Available. **Hardening:** Paving block and Granit tile **Drainage:** There is closed drainage without a clear manhole. There's an open drainage system that interferes with walking activity. A manhole is located on the body of the road.  
Facilities (Street Furniture)	**Lights:** The light design is not aesthetic. The distance between the lights creates a poor visual effect.  **Green line:** A green line of trees and plants in a pot interferes with marked pedestrian

tracks.

Directions:
Pedestrian directions are not available.

Traffic signs:
- Traffic signs are available.
- No pedestrian platforms are available at intersections or streets.

Bench:
The bench is available. The design and shape are of poor quality.

Garbage can:
The garbage tub is available, but the quality is poor and the placement is inaccurate.

Accessibility

Track hindrance:
Obstacles to pedestrians are caused by the placement of pedestrian attributes (trees, cisterns, garbage cans, bollards, benches) that are placed intact, narrow and broken paths, and walking activities mixed with wild motorcycle parking.



Design	**Line arrangement:** The pedestrian lanes of *Pangeran Diponegoro* and *Jenderal Sudirman* Street are not well arranged. Bad arrangements caused discomfort to the walking man's fund. The track arrangement does not outline the user's inclusion side. **Stopping point:** The pedestrian tracks on this road are quite long and exhausting if no adequate stops are provided. As for the stops, it's just a bad-quality bench. It's not uncommon for city residents to be active on pedestrian paths but not well accommodated, either to sit comfortably or to leave the vehicle when stopping for a moment to enjoy the city. **Bus stop:** This line is a high-speed vehicle traffic area and is passed by public transport. Stops are available, but the location is above the line, interfering with pedestrian paths.
	
	Attractions: This pedestrian path is less inclusive for middle-class people. Minimal infrastructure, such as bike lanes, bicycle parking, and bike rental facilities, as well as landmarks as centres of citizen activity, makes the lanes on both of these roads look secluded and less in demand.
Safety Facility	**Ramp:** Implementation of landing at the edge of the line shift and in the entrance area of the area is less well observed. This creates discomfort and uncertainty for travellers, especially the disabled users.


Pedestrian track:
Track cut toward the secondary road.

Crossings:
No traffic lights for pedestrians were found. There are no pedestrian platforms available on the street. No platform pedestrian tracks are available at the intersection.


Bollard:
The safety fence is available, but the shape poses a minor accident risk. A bollard does not serve as security but as an accessory.

5 Conclusion

The pedestrian area in a city should be designed to accommodate all urban and inclusive activities. However, in the City of Medan, particularly on Pangeran Diponegoro and Jenderal Sudirman Street, the

pedestrian areas are not well-organized and planned. The existing facilities are not positioned according to their respective zones and functions, the quality of the materials used on the pedestrian track is poor, and the technical aspects of the track are not serious enough to be used by the public. This gives the pedestrian a negative visual experience. Additionally, the design of pedestrian complementary elements is not in line with the environment. This condition does not show an inclusive plan for all genders, ages, social classes, and disabilities. As a result, pedestrians on Prince Diponegoro and General Sudirman Street do not prefer to use the pedestrian areas and respond negatively to them.

Acknowledgements. Thank you to LPPM Unimed, which has funded the Applied Product Research Budget 2023 at the Universitas Negeri Medan. The existence of this research program, it is expected to improve the academic quality of lecturers in the field of research.

References

[1] Nasution, I.N., (2021). Pedestrian Kampus Konsep Active Living. Medan: LPPM Unimed.

[2] Permen PU. Pedoman perencanaan, penyediaan, dan pemanfaatan prasarana dan sarana jaringan pejalan kaki di kawasan perkotaan, Nomor 03/PRT/M/2014, 26 Februari 2014.

[3] Sakinah, R., Kusuma, H. E., Tampubolon, A. C., & Prakarso, B. (2018). Kriteria jalur pedestrian di Indonesia. Jurnal Lingkungan Binaan Indonesia, 7(2), 81-85. 2018.

[4] Althoff, T, Socic, R., Dkk. 2017. Large-scale physical activity data reveal worldwide activity inequality. Nature 547, 336–339 (20 July 2017) doi:10.1038/nature23018.

http://www.nature.com/nature/journal/v547/n7663/full/nature2 3018.html. Accessed by March 18, 2021, at 07.09 WIB.

[5] Untermann, R. K. (1984). Accommodating the Pedestrian: Adapting Towns & Neighbourhoods for Walking and Bicycling. New York: Van Nostrand Reinhold Company.

[6] Shirvani, H. (1985). The Urban Design Process. New York. VNR Company.

[7] Sugiyono (2007). Metode Penelitian pedidikan pendekatan kuantitatif, kualitatif, dan R&D. Bandung: ALFABETA.

[8] Danisworo, (1991). Teori Perancangan Urban, Bandung, Fakultas Pascasarjana, ITB.

[9] Gehl, Jan. (2010). Cities for People. Island Press. Washington DC.

[10] Kostof, Spiro. (1992). The City Shaped: Urban Patterns and Meanings Through History. Little, Brown, and Company.

[11]http://repository.uinsu.ac.id/13409/1/Fix%20Alhamdulillah%20Skripsi%20Fanni%20Febrianti.pdf. Accessed by May 29, 2023 at 12.00 WIB.