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UTILIZATION OF SIDEWATERS ON PRINCE DIPONEGORO STREET KH. ZAINUL ARIFIN, MEDAN CITY

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Abstract

As the capital of North Sumatra Province, Medan City demands the availability of qualified urban infrastructure to offset its dynamic development pace. One of the crucial elements supporting public movement is pedestrian facilities or sidewalks. However, the current condition of the pedestrian paths along the Jalan Pangeran Diponegoro – Jalan KH. Zainul Arifin corridor is not functioning optimally due to widespread illegal parking occupancy, street vendor activities, and a lack of complementary facilities. This study was conducted to assess the existing condition of pedestrian facilities on Jalan Pangeran Diponegoro – Jalan KH. Zainul Arifin while formulating tactical strategies to improve service quality and user comfort. The research approach applied is a quantitative descriptive statistical method. The study results indicate that the utilization and feasibility of pedestrian paths at that location are still below the required comfort standards. Several fundamental obstacles found in the field include the misuse of sidewalk functions by parked vehicles and vendors, as well as the scarcity of essential supporting elements. Based on these findings, this study formulates a number of technical recommendations, including the enforcement of parking zones, relocation of vending areas, and the provision of representative supporting facilities. The implementation of these proposed improvements is expected to create a safe and comfortable walking space, as well as serve as a stimulus for sustainable transportation infrastructure development in urban areas.

Keywords: Sidewalk, Service Quality, Pedestrian Comfort, Jalan Pangeran Diponegoro – Jalan KH. Zainul Arifin

INTRODUCTION

Medan City, as the administrative and economic center of North Sumatra Province, continues to transform into a dynamic metropolitan city. According to data from the Medan Central Statistics Agency (BPS) in 2026, the population of Medan City has reached approximately 2,540,120 people. This rapid population growth has a direct impact on the increasing need for urban mobility and traffic congestion on the road network, especially in areas developing as centers for office and commercial activities. To support high urban mobility, the availability of adequate physical infrastructure, particularly integrated transportation facilities, is a key prerequisite for unimpeded development. Accessibility to public facilities in urban areas is highly dependent on the quality of available infrastructure, which not only supports economic productivity but also the quality of community social interaction.

One of the vital elements in the urban transportation system that supports mobility is the pedestrian path or sidewalk. A pedestrian path or sidewalk is a type of physical infrastructure in the form of a road specifically designed for walking activities, pedestrians have the right to the availability of supporting facilities such as sidewalks, crossings, and other facilities. Pedestrians have the right to get priority when crossing the road at a crossing (Law No. 22 of 2009 Article 131). Planning for pedestrian road needs must be well planned in accordance with the provisions of standard regulations for planning pedestrian roads, by paying attention to and prioritizing aspects of pedestrian safety and comfort. Currently, many pedestrian paths are found not only that their original function has changed, but also the function of the sidewalk is given to provide comfort and security for pedestrians. This causes pedestrians to feel uncomfortable when crossing the sidewalk. SNI 03-2443-1999 emphasizes that the main function of pedestrians is to provide optimal service to pedestrians both in terms of safety and comfort. Therefore, the existence of pedestrian roads is an effort to minimize pollution and the quality of the urban environment. Roads The route from Pangeran Diponegoro to KH. Zainul Arifin Street is a strategic corridor in Medan City, with high levels of office and commercial activity, resulting in high pedestrian traffic, especially during peak hours.

Based on the results of a preliminary survey conducted during the afternoon peak hour (17.00-18.00 WIB), the pedestrian volume was 110 people/hour. with a high degree of saturation (Dj) value. This condition indicates that the pedestrian path has reached saturation point, which is not caused by the volume of pedestrians alone, but rather due to a drastic decrease in the effective capacity of the sidewalk. This condition indicates that the sidewalk function in this location is not optimal due to the rampant functional disturbances at several points such as the conversion of land into vehicle parking areas and being filled with street vendors (PKL). This creates side obstacles that force pedestrians onto the road, thus threatening their safety. In addition to the problem of sidewalk use, the decline in the level of service in the area is exacerbated by the lack of supporting facilities. The lack of natural shade in the hot weather conditions of Medan City, as well as the limited trash bins and aesthetic elements of public spaces, reduce public interest in walking. This unkempt and non-inclusive physical condition indicates the need for a comprehensive analysis. Therefore, in an effort to optimize the function of the pedestrian path on Jalan Pangeran Diponegoro - Jalan KH. Zainul Arifin to be more efficient and comfortable for pedestrians, an in-depth analysis of field conditions related to user comfort is needed.

LITERATURE REVIEW

1. Rizza Ananda Lubis, Marwan Lubis, and Hamidun Batubara (2023)
   With the title "Evaluation of the Comfort Level of Pedestrian Paths as Pedestrian Facilities in Medan City". This study has the main objective to conduct a physical compliance audit of pedestrian paths on Jalan Balai Kota Medan by referring to the normative standards of PERMEN PU No: 03 / PRT / M / 2014 and PUPR Guidelines 2018. By using a quantitative performance analysis method that measures pedestrian volume and path capacity, the results of the study indicate that the path performance is at the level of service (LOS) B and C. The comparison with this thesis is the similarity of macro loci in Medan City, but previous studies have focused more on the mathematical aspect of capacity calculations, while this study will more deeply evaluate the condition of physical damage to materials and their influence on real comfort of use.
2. Amirotul Husna Afifah, et al. (2023)
   With the title "Analysis of Pedestrian Path User Comfort in Gajahmada Street Corridor Pontianak". This study aims to identify the dominant factors that reduce comfort in commercial areas. The method applied is descriptive quantitative through questionnaires and observations. The results of the study revealed that the average comfort level of users is at 58% which is included in the "Quite Comfortable" category. And found that street vendor occupancy and illegal parking are the main obstacles. Criticism of this study is the lack of discussion regarding the details of the technical dimensions of the sidewalk. The author's research will fill this gap by integrating an audit of the physical condition of the sidewalk building with the perception of side obstacles.
3. Lia Mardalena and Haris Murwadi (2022)
   With the title "Analysis of the Comfort Level of Walking Students on Pedestrian Paths in Bandar Lampung City". This study aims to evaluate the comfort index of walking for a specific user group, namely students, along Jalan ZA Pagar Alam. Using field observation methods and questionnaire distribution, the results of the study revealed that the comfort level index is still very low at only 42.4% (less comfortable category), due to uneven path surfaces and minimal shade facilities. Its relation to this thesis is on the use of physical comfort parameters, but the author's research has a broader scope because it involves heterogeneous respondents in office and commercial areas that have more complex obstacle characteristics than educational areas.
4. Akram Abubakar, et al. (2022)
   By title" Analysis of Pedestrian Comfort Level Perceptions on the Use of Urban Road Sidewalks Case on Jalan Ahmad Yani, HOS Cokroaminoto, Makassar City. This study aims to evaluate whether the pedestrian path at this location has met the required standards in terms of safety and comfort based on the perception of pedestrians in using the sidewalk. Using a descriptive qualitative analysis method. The results of the study show that the coefficient value of the accessibility variable is 9.563, circulation is 0.989, natural and climatic conditions are 4.731, sidewalk landscape is 5.506. Meanwhile, the coefficient value of the security variable (X5) and cleanliness (X6) does not have an effect on the level of pedestrian comfort on Jalan Ahmad Yani, Makassar City. Referring to the coefficient value for each independent variable (X) shows that the accessibility variable and the form of the sidewalk landscape are the most influential factors on the level of pedestrian comfort in using the pedestrian path on Jalan Ahmad Yani, Makassar City, and this study provides results in the form of the need for policy support that focuses on variables with the greatest influence on the real needs of pedestrians. What has not been achieved in this study is a detailed analysis of the elements aesthetics and complementary facilities that support passive comfort. The author's research in the Jl. Pangeran Diponorogo corridor will fill this gap by evaluating the use of supporting facilities such as benches and shading elements.

5. Muhammad Alwi Hasan and Ahmad Yusuf Efendi (2025)
   With the title "Analysis of the Comfort Level of Pedestrian Paths on Pahlawan Street and Sriwijaya Street, Semarang City. The research method used is descriptive qualitative with a Likert Scale to measure satisfaction. The results of the study show that the quality of the pedestrian path on Pahlawan Street as a whole is in the very satisfied category, with an average comfort value of 83%. Factors such as lane width, lighting, supporting facilities, and accessibility contribute positively to this result. In contrast, the pedestrian path on Sriwijaya Street shows a lower quality, with an average comfort value of 57%, which is included in the quite satisfied category. Factors that influence this result are the lack of open space, facilities for people with disabilities, and the presence of barriers along the path. Comments on these results inspired the author to conduct a similar comparative analysis between Jl. Pangeran Diponorogo which is formal with Jl. KH. Zainul Arifin which is more commercial in nature to see the extent to which the inclusiveness aspect has been implemented.
6. Umar Abdul Aziz, Isnaeni Rokhimah, and Agung Setiawan (2022)
   With the title "Analysis of Pedestrian Comfort Regarding Sidewalk Utilization in Kutoarjo Urban Area, Purworejo Regency (Case Study of Letjen MT. Haryono Street and Tanjunganom Street)". The main objective of the study is to analyze the level of pedestrian comfort regarding sidewalk utilization in Kutoarjo urban area, considering the shift in function of sidewalks into other activity places such as street vendors (PKL) selling places.
   The method used in this study was descriptive research with a survey method, where data collection techniques were carried out by distributing questionnaires to 70 respondents on Jalan Letjen MT. Haryono and 70 respondents on Jalan Tanjunganom. Data analysis was conducted quantitatively to measure user perceptions of the available facilities.
   The results of the study indicate that the level of pedestrian comfort on Jalan Letjen MT. Haryono is at 55.42% which is included in the "Quite Comfortable" category, while on Jalan Tanjunganom the results were 57.14% which is also included in the "Quite Comfortable" category. These findings indicate that although the sidewalk can still be used, the presence of side obstacles such as street vendors and incomplete supporting facilities significantly reduce user comfort. The comparison with the author's thesis entitled "Analysis of Pedestrian Conditions and Comfort Regarding the Utilization of Pedestrian Paths on Jl. Pangeran Diponorogo – Jl. KH. Zainul Arifin" lies in the emphasis on the "Physical Condition" aspect. While Aziz et al.'s (2022) research focuses more on perceptions due to land conversion, the author's thesis will combine a technical analysis of physical damage to infrastructure with user comfort perceptions.

METHOD

Based on the research flowchart, the preparation stage is a crucial initial step in ensuring the smoothness of the research process and the accuracy of the data to be obtained in the field. In this phase, researchers synchronize the side obstacle phenomena found in the corridor of Jl. Pangeran Diponegoro – Jl. KH. Zainul Arifin with applicable technical regulations, such as the Pedestrian Facility Planning Guidelines from the Ministry of PUPR and Law No. 22 of 2009. This preparation includes strengthening research instruments, both in the form of physical observation sheets and comfort perception questionnaires, to ensure that all research variables can be measured validly and reliably.

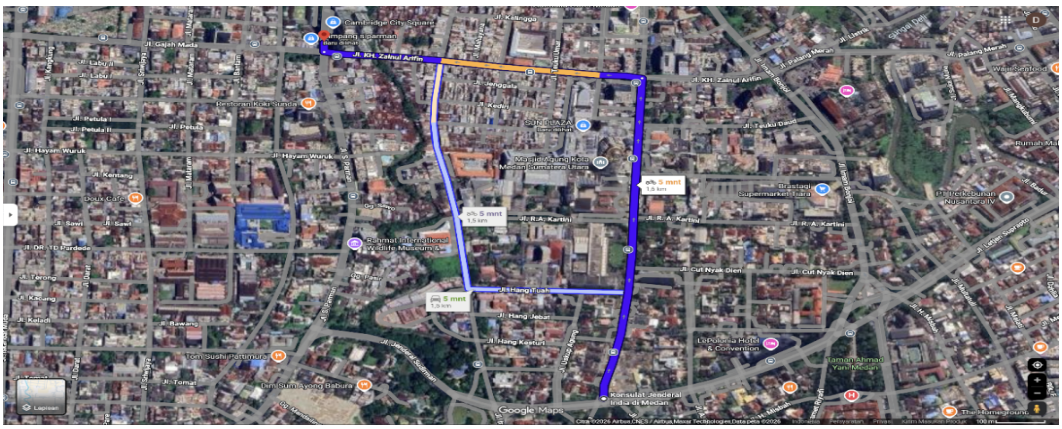

Figure 1 Research Location
Source: Google Map

Research Tools and Materials

To facilitate the process of data collection in the field and ensure accurate analysis results, researchers are supported by the use of practical tools and materials.

Table 1Equipment used

No	Tool Name	Specification	Functions to Help Researchers
1	A Set of Stationery	Pen, Pencil, Eraser, Whiteboard	Makes it easier for researchers to record the results of field measurements and observations quickly and neatly.
2	Meter (Roll Meter)	Length 5–50 Meters, Material Steel/Fiberglass	Help researchers obtain accurate physical dimensions of sidewalks (width and height).
3	Camera / Smartphone	Minimum resolution 12 MP	Facilitates visual documentation of real road conditions and obstacles for pedestrians.
4	Drone		
5	Laptop	Minimum RAM 8GB / Windows/Mac OS	Simplify the process of processing questionnaire data and preparing final reports.
6.	Questionnaire Sheet	Print (A4 HVS) / Google Form	Helps to gather opinions or perceptions of comfort from pedestrian respondents.
7.	Study Location Map	Satellite Imagery / Google Maps	Facilitates the determination of the study area boundaries from Jl. Diponegoro to Jl. KH. Zainul Arifin
8.	Regulatory Standards	SNI / Regulation of the Minister of PUPR	As a reference to help researchers assess the suitability of existing pedestrian facilities.

Method of collecting data

The data collection process is a fundamental step in this research to ensure the validity of the analysis results regarding the physical condition and comfort level of the pedestrian path. Researchers implemented a comprehensive approach by integrating various data collection techniques to obtain a complete and objective picture of the study area in the corridor from Jalan Pangeran Diponegoro to Jalan KH. Zainul Arifin.

Population and Sample

1. Population
   According to Arikunto (2010), a population is the entirety of the research subjects. In the context of this study, the population in question is an infinite population , namely all the people or pedestrians who pass by and use the sidewalk facilities along the research location. This population includes users from various activity backgrounds, both routine and incidental pedestrians in this strategic area.
2. Sample
   A sample is a portion of a population taken to represent all research subjects. Considering that the population size cannot be calculated with certainty, the researcher applies the Non-Probability Sampling technique with the Accidental Sampling approach. According to Sugoyono (2013), a sample is a portion of the number and characteristics of a population. The sample in this study was taken by referring to the Slovin Formula as an instrument to determine the minimum number of samples to help researchers obtain accurate results with a margin of error of 7.5% using the Slovin formula as follows:
   Slovin's formula:
   $$n = \frac{N}{1+Ne^2} \quad \text{.....(2)}$$
   Information :
   n= Minimum sample size.
   N = Population size (in this case using the estimated volume of pedestrians)
   daily feet).
   e = The specified precision level or error tolerance limit (0.075).

Data analysis

First, the researcher applied descriptive analysis to process primary data sourced from respondents' perceptions. Data collected through questionnaires were classified based on categories of comfort, safety, and completeness of facilities. The researcher used data processing software such as SPSS to tabulate respondents' answers into frequency distribution tables and percentages. Second, the researcher conducted a comparative analysis

by comparing the results of physical observations in the field with applicable technical standards. Sidewalk dimension data, such as effective lane width and curb height, measured using a tape measure, were compared with parameters in the Minister of Public Works and Public Housing Regulation No. 03/PRT/M/2014 and guidelines from the Directorate General of Highways. This process aims to identify gaps (gap analysis) between the reality of infrastructure and ideal regulations. Thus, the researcher can draw objective conclusions regarding the extent to which the pedestrian path is technically feasible in supporting community mobility in urban areas.

RESULTS AND DISCUSSION

Validity Test of Jl. Pangeran Diponegoro

Table 2 Validity test table for Jl. Pangeran Diponegoro

Total	Pearson correlation	Sig. (2-tailed)	N	Information
	0.748	0,000	89	R count > R table (Valid)

Source: Own Processing

Based on the results of the validity test conducted using the Pearson product moment method, the calculated r value was 0.748, while the table r value at a significance level of 5% with 89 respondents was 0.173. Because the values:

$$r_{hitung} = 0{,}748 > r_{tabel} = 0.173$$

Therefore, it can be concluded that the research instrument is valid. Furthermore, the significance value of 0.000 is less than 0.05, indicating that all questionnaire items are able to measure the research variables effectively and are suitable for use in research.

Reliability Test

Table 3 Reliability test table for Jl. KH. Zainul Arifi

Reliability Statistics	
Cronbach's Alpha	N of Item
.946	18

Source: Own Processing

Based on the results of the reliability test using the Cronbach's Alpha method, the Cronbach's Alpha value was obtained at 0.946 with a total of 18 question items. Based on the reliability testing criteria, the instrument is declared reliable if the value is:

$$\alpha > 0.60$$

Because the Cronbach's Alpha value obtained is:

$$0.944 > 0.60$$

Therefore, it can be concluded that the research instrument has a very high level of reliability. This indicates that all questions in the questionnaire have a good level of consistency and can be trusted for use in research.

Validity Test of KH. Zainul Arifin's Path

Table 4 Validity test table for Jl. KH. Zainul Arifin

Total	Pearson correlation	Sig. (2-tailed)	N	Information
	1	0,000	89	R count > R table (Valid)

Source: Own Processing

Based on the results of the validity test conducted using the Pearson product moment method, the calculated r value was 1, while the table r value at a significance level of 5% with 89 respondents was 0.173. Because the values:

$$r_{hitung} = 1 > r_{tabel} = 0.173$$

Therefore, it can be concluded that the research instrument is valid. Furthermore, the significance value of 0.000 is less than 0.05, indicating that all questionnaire items are able to measure the research variables effectively and are suitable for use in research.

KH. Zainul Arifin Road Reliability Test

Table 5 Reliability test table for Jl. KH. Zainul Arifi

Reliability Statistics	
Cronbach's Alpha	N of Item
.944	18

Source: Own Processing

` Based on the results of the reliability test using the Cronbach's Alpha method, the Cronbach's Alpha value was obtained at 0.944 with a total of 18 question items. Based on the reliability testing criteria, the instrument is declared reliable if the value is:

$$\alpha > 0.60$$

Because the Cronbach's Alpha value obtained is:

$$0.944 > 0.60$$

Therefore, it can be concluded that the research instrument has a very high level of reliability. This indicates that all questions in the questionnaire have a good level of consistency and can be trusted for use in research.

Analysis of Pedestrian Perceptions of the Comfort Level of Sidewalks in Both Road Corridors

Table 6 Summary of Research Results on the Analysis of Sidewalk Comfort Conditions

No	Indicator	% Jl. Pangeran Diponegoro	Category	% KH. Zainul Arifin	Category
1	Circulation	72.27%	Comfortable	69.92%	Comfortable
2	Climate	74.34%	Comfortable	76.67%	Comfortable
3	Security	73.41%	Comfortable	75.38%	Comfortable
4	Form	77.05%	Comfortable	73.18%	Comfortable
5	Cleanliness	74.77%	Comfortable	71.93%	Comfortable
6	Aroma	68.64%	Comfortable	65.23%	C. Comfortable
7	Beauty	77.95%	Comfortable	75.91%	Comfortable
8	Noise	70.00%	Comfortable	69.09%	Comfortable

Source: Own Processing

Based on Table 6, the data recapitulation results in the table above, it can be seen that respondents' assessments of the level of pedestrian comfort at the research location showed positive results. Of all the comfort indicators examined on the pedestrian path, all indicators generally met the established assessment criteria. The data processing results indicate that the majority of the assessment indicators fall into the comfort category. This indicates that the physical condition of the facilities and environment along the pedestrian path is sufficient to provide a sense of safety and comfort for passersby. However, repairs and maintenance efforts still need to be carried out periodically. This aims to maintain or improve the quality of service on the pedestrian path for the future.

The main inhibiting factors for people's comfort when walking on both corridors of the road

Based on the research results, it is known that the factors inhibiting public comfort when walking on sidewalks are as follows:

1) Circulation Indicator
   The percentage of respondents in the questionnaire was low (73.18% - 77.05%). Respondents disagreed because the sidewalk's physical form had changed function. The main obstacle was land occupancy. On Jalan KH. Zainul Arifin, the sidewalk was covered by street vendors' stalls and billboards.
2) Climate Indicators
   Where in the statement given in the questionnaire the percentage is Lowest (65.23% - 68.64%): This figure is the lowest due to the obstacle in the form of thermal discomfort (extreme weather). On Jalan KH. Zainul Arifin, respondents felt the air was very hot and uncomfortable due to the absence of shade trees. On Jalan Pangeran Diponegoro, even though there are mahogany trees, respondents' perceptions remain low because the position of the open sidewalk makes them directly exposed to the heat of the midday sun and the stinging pollution of vehicle exhaust.

Efforts to Improve the Quality of Sidewalk Services

Based on the analysis of questionnaire data and the findings of obstacles in the field, several strategic steps are needed from relevant parties to improve sidewalk facilities on Jalan Pangeran Diponegoro and Jalan KH. Zainul Arifin. Improvement efforts will focus on indicators with low percentage values to achieve optimal pedestrian comfort. Possible measures include the following:

1. Circulation Indicator
   Based on the research results, the overall circulation indicator recorded a feasibility score of 72.27% on Jalan Pangeran Diponegoro and 69.92% on Jalan KH. Zainul Arifin. Although generally included in the comfortable category, special attention should be given to the point of freedom of walking from obstructions on Jalan KH. Zainul Arifin which has the lowest score of 63.41%. The necessary steps are to ensure that the effective width of the sidewalk is maintained properly so that pedestrians can move freely without obstacles, as well as limiting the placement of commercial objects that can narrow the circulation space of the road during peak hours.
2. Climate Indicators
   Based on the research results, the overall climate indicators are at 74.34% for Jalan Pangeran Diponegoro and 76.67% for Jalan KH. Zainul Arifin. Efforts that must be made are to minimize the effects of direct sun exposure along the sidewalk through better shade planning, considering that the lowest value on Jalan Pangeran Diponegoro is at the point of availability of artificial/natural shade facilities with a figure of 72.05%. This is crucial so that pedestrians are not directly exposed to the extreme weather of Medan City when walking during the day.
3. Security Indicators
   Based on the research results, the overall security indicators recorded a figure of 75.38% on Jalan KH. Zainul Arifin and 73.41% on Jalan KH. On Jalan Pangeran Diponegoro, efforts must be made to maximize the use of low-level street lighting (pedestrian lighting) at night and to maintain open sidewalks to minimize blind spots and reduce public anxiety about crime.
4. Shape Indicator
   Based on the research results, the overall form indicators recorded values that need to be improved, namely only 77.05% on Jalan Pangeran Diponegoro and 73.18% on Jalan KH. Zainul Arifin, the main effort that must be made is to improve the quality of service by improving the condition of the sidewalk in accordance with applicable regulatory standards.
5. Cleanliness Indicators
   Based on the research results, the overall cleanliness indicator reached 74.77% on Jalan Pangeran Diponegoro and 71.93% on Jalan KH. Zainul Arifin, efforts that must be made are to place sorting trash bins periodically along the road corridor with an ideal interval (for example, every 15–20 meters). Maintenance and waste collection must also be carried out routinely to prevent accumulation that disrupts the aesthetics of the road.
6. Aroma Indicator
   Based on the research results, the overall Aroma indicator recorded a low percentage among the indicators studied, namely 68.64% on Jalan Pangeran Diponegoro and 65.23% on Jalan KH. Zainul

Arifin. In fact, the point of freedom from sewer/garbage odor on Jalan KH. Zainul Arifin is at a critical level of 62.73%. Real efforts that must be made are to improve the drainage system by installing tight covers and cleaning sediment regularly and providing trash bins along the sidewalk.

7. Beauty Indicator
   Based on the research results, the overall beauty indicators accumulatively received an assessment of 77.95% on Jalan Pangeran Diponegoro and 74.55% on Jalan KH. Zainul Arifin. Efforts that must be made are that this aesthetic quality must be maintained and improved through regular maintenance of the sidewalk, maintaining the beauty of shade vegetation, and ensuring that the sidewalk floor material remains neat and in harmony with the characteristics of the surrounding environment or buildings in order to provide an attractive visual impression, especially on Jalan Kh. Zainul Arifin.
8. Noise Indicator
   Based on the research results, the overall noise indicators recorded a figure of 70.00% on Jalan Pangeran Diponegoro and 69.09% on Jalan KH. Zainul Arifin due to the position of the sidewalk which is very close to the flow of vehicle traffic without any protection. Technical efforts that must be taken are to create a physical barrier in the form of a green belt planted with densely leafed shrubs or installing a safety fence (railing). This barrier has a dual function of reducing the propagation of noise from the highway while preventing motorcyclists from misusing the pedestrian area to pass or park illegally.

Visualization of pedestrian illustration on KH. Zainul Arifin Street

Figure 2 3D view of the pedestrian path
Source: Own Processing

The image above shows a 3D visualization of pedestrian movement in the PTV Vissim simulation in the corridor of Jl. KH Zainul Arifin, Medan City, which represents the condition of pedestrian flow during peak hours on weekends at the left sidewalk position.

CONCLUSION

Based on the research that has been conducted by analyzing data, physical observations in the field, and processing perception data of 178 respondents using the SPSS application regarding the condition and comfort of pedestrian paths or sidewalks on Jalan Pangeran Diponegoro to Jalan KH. Zainul Arifin, several things can be concluded as follows:

1. Based on the research that has been conducted by analyzing data, physical observations in the field of the actual condition of pedestrian facilities in both corridors show contrasting characteristics. The pedestrian path on Jalan Pangeran Diponegoro is relatively physically good with patterned concrete and ceramic floors, 20 cm high curbs, underground drainage, functional street lighting, and shady mahogany trees. In contrast, Jalan KH. Zainul Arifin has limited physical space (narrower), minimal shade vegetation, and experiences high space occupancy due to billboards/ neon boxes . However, both roads have been equipped with main facilities such as yellow guiding blocks and street lighting. Based on SPSS data processing of 8 comfort indicators, the following comparative results were obtained:

a. Circulation Indicator, Jalan Pangeran Diponegoro obtained 72.27% (Comfortable), superior to Jalan KH. Zainul Arifin at 69.92% (Comfortable) lower due to side obstacles.
b. Climate Indicator, Jalan KH. Zainul Arifin recorded a score of 76.67% (Comfortable), slightly higher than Jalan Pangeran Diponegoro at 74.34% (Comfortable) because pedestrians use the corridors/canopies of shop buildings for shelter.
c. Safety Indicator, Jalan KH. Zainul Arifin achieved 75.38% (Comfortable), higher than Jalan Pangeran Diponegoro at 73.41% (Comfortable) due to the natural social control from the busy commercial area activities.
d. Form Indicator, Jalan Pangeran Diponegoro obtained 77.05% (Comfortable), while Jalan KH. Zainul Arifin was 73.18% (Comfortable) due to the reduction in effective width due to street vendor stalls (PKL).
e. According to the Cleanliness Indicator, Jalan Pangeran Diponegoro scored 74.77% (Comfortable), while Jalan KH. Zainul Arifin scored 71.93% (Comfortable). This is due to the lack of trash bins.
f. Aroma Indicator: Jalan Pangeran Diponegoro is at 68.64% (Comfortable), while Jalan KH. Zainul Arifin recorded the lowest value of 65.23% (Quite Comfortable) due to pollution.
g. Beauty Indicator, Jalan Pangeran Diponegoro scored 77.95% (Comfortable), while Jalan KH. Zainul Arifin scored 75.91% (Comfortable) due to the lack of a beautiful impression on the Zainul Arifin route.
h. Noise Indicator: Jalan Pangeran Diponegoro is at 70.00% (Comfortable), slightly higher than Jalan KH. Zainul Arifin at 69.09% (Comfortable) due to the influence of vehicle volume density.

2. Based on the research results, it can be seen that the Level of Service and fulfillment of safety standards based on Law No. 22 of 2009 and technical guidelines for pedestrian facilities (SE Director General of Highways No. 07/P/BM/2023) show that Jalan Pangeran Diponegoro has met most of the regulatory criteria, especially in the parameters of path continuity and horizontal space freedom. On the other hand, Jalan KH. Zainul Arifin has not met the ideal technical standards because the function of the yellow guiding block for people with disabilities (inclusive accessibility) is broken and not functional due to being blocked by illegal parking of two-wheeled vehicles and commercial properties.
3. Based on the results of questionnaire data analysis and direct observations in the field, the main factors that are obstacles and hinder the comfort of the community in using pedestrian paths at the two study locations are described in detail as follows:

a. Circulation indicators Where on the road KH. Zainul Arifin The biggest obstacle stems from the high activity of street vendors (PKL) who set up stalls on the sidewalks, as well as the rampant illegal parking of motorcycles owned by visitors to commercial shops, who use the pedestrian lanes as secondary parking areas. This results in a reduction in the effective width of the sidewalks, severely limiting free space for pedestrians.
b. Climate Indicators on the Pangeran Diponegoro Street Corridor. Although this corridor is dominated by mahogany trees, the sidewalks are very open in certain segments without secondary protection, so that pedestrians feel the heat of the midday sun directly in areas unprotected by trees, while also being exposed to the blowing smoke and dust from vehicles from the busy arterial circulation route.

4. Based on the results of the percentage values obtained from each indicator, the efforts to optimize the improvement of service quality from each indicator are as follows:

a. In the circulation indicator, efforts are to ensure that the effective width of the sidewalk is maintained properly so that pedestrians can move freely without obstacles, as well as limiting the placement of commercial objects that can narrow the road circulation space during peak hours.
b. In climate indicators, efforts that must be made are to minimize the effects of exposure to hot sun and shelter in case of direct rain along the sidewalk through better planning of shade, such as bus stops.
a. In the Security Indicator, efforts that must be made are to maximize the function of low-scale street lighting (pedestrian lighting) at night and to arrange the sidewalk space so that it remains open to minimize blind spots and reduce public anxiety about crime as well as installing physical barriers in the form of sturdy bollards along the edge of the sidewalk to prevent two-wheeled vehicles from going onto the sidewalk.
b. In the Indicator, the form of effort that must be made is to improve the quality of service by improving the condition of the sidewalk in accordance with applicable regulatory standards.
c. In the cleanliness indicator, efforts must be made to place sorting bins periodically along the road corridor at ideal intervals (for example, every 15–20 meters). Waste maintenance and removal must also be carried out routinely to prevent accumulation that disrupts the aesthetics of the road.

d. In the odor indicator, efforts that must be made are to improve the drainage system by installing tight covers and carrying out regular sediment cleaning and providing trash bins along the sidewalk.
e. In the beauty indicator, the efforts that must be made are that this aesthetic quality must be maintained and improved through regular maintenance of the sidewalk, maintaining the beauty of shade vegetation, and ensuring that the sidewalk floor material remains neat and in harmony with the characteristics of the surrounding environment or buildings to provide an attractive visual impression, especially on Jalan Kh. Zainul Arifin.
f. For noise indicators, physical barriers should be created, such as green belts planted with densely leafy shrubs or railings . These barriers serve the dual purpose of reducing noise transmission from the roadway and preventing motorcyclists from misusing pedestrian areas for illegal parking.

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