

**STUDY OF FOOTWAY AND BIKE TRAVEL FACILITIES AS A PUBLIC TRANSPORT
MODE INTEGRATION FACILITY IN SOUTH TANGERANG CITY
(CASE STUDY: SUDIMARA STATION)**

Muhammad Baharudinsah

Civil Engineering Department, Ibn Khaldun University Bogor, INDONESIA

E-mail: muh.baharudinsah@gmail.com

ABSTRACT

It is known that South Tangerang City is one of the fastest growing cities. This indicates that the increasing number of users of transportation means that facilities for transportation users need to be considered, one example is pedestrians. The unrealized development of pedestrian facilities is caused by the transfer of function of pedestrian facilities for public needs and insufficient space for pedestrians. The lack of pedestrian facilities causes pedestrians to pass by and has an impact on public transportation that is currently operating, causing congestion. Sudimara Station is located in Ciputat District, South Tangerang City, with a population growth rate of 3.0% in 2019. All buildings are provided for pedestrians to provide services to pedestrians so as to improve pedestrian smoothness, safety and comfort. The purpose of this study was to analyze the performance of pedestrian facilities at Sudimara Station. The method used is direct field survey and data processing using Microsoft Excel, AutoCad. The results of the author's research include the minimum width of the sidewalk in 2020 and 2025 of 1.5 - 1.6 meters and the service level of pedestrian facilities is classified as A, which means that pedestrians can walk freely, including being able to determine the direction of walking freely, at speed, relatively fast without causing interference between pedestrians. The existing conditions of the sidewalks in 2020, namely there are several obstacles for pedestrians such as the presence of street vendors, public transportation parking carelessly, and several motorbikes parked carelessly, buying and selling activities in markets close to Sudimara station and the absence of integration facilities around the place. The planning that the authors do is to increase the width of the sidewalk to 1.5 meters, and the addition of street lighting facilities.

Keywords: pedestrian; facilities; growth; performance; planning.

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INTRODUCTION

Changes in globalization have an impact on all aspects of life. One of the aspects affected is the transportation aspect. However, the changes that occur do not always go well, one example is the transportation facilities, especially the pedestrian facilities at Sudimara Station in South Tangerang City. As is well known, South Tangerang City is one of the fastest growing cities. This indicates that the increasing number of users of transportation means that facilities for transportation users need to be considered, one example is pedestrians. In order for the development aspect to run in balance, it is necessary to develop a quality and balanced development between aspects. Thus it is necessary to have a study that can help government performance to determine the characteristics and expectations of pedestrians in order to realize better facilities. **Analysis of pedestrian facilities and bicycle paths as an integrated public transport facility in South Tangerang City".**

Pedestrian Facilities

According to (Pradipto et al., 2014) Pedestrians are one of the modes of transportation whose movements are natural (natural mobility). As a mode of transportation, pedestrians also have several characteristics as well as other modes of transportation.

Pedestrian Facility Performance

According to (Iswanto, 2006) pedestrian space also has traffic parameters that can reflect the level of performance of available facilities, such as pedestrian speed, the amount of pedestrian space, pedestrian flow, and pedestrian density. This is a pedestrian traffic parameter that can affect the level of service. To provide maximum benefit from pedestrian space for pedestrians, the above factors must be achieved properly.

For pedestrian activities, it is hoped that pedestrian users will take advantage of the actual conditions, so that they can get the comfort of the pedestrians themselves. Each determines policies related to road traffic based on standard regulations set by the government, including pedestrians who take advantage of the space to carry out sporting activities and healthy walking. Bicycles are non-motorized vehicles that can pass pedestrians. The disturbance caused by the presence of motorized vehicles passing through the pedestrian area must be dealt with firmly by the government and field supervisors (Syaiful, L.Akbar, 2015); (Syaiful, 2015); (Thamrin, Syaiful, 2016). So that there will be no more violations of road and pedestrian traffic. This concept will make people's journey to a place of exercise more comfortable. This activity is conveyed and indicates that the community needs good and mutually supportive conditions, so that it is hoped that in the future there will be no more disturbances in the field including motorized vehicles including the environment and noise (S.Syaiful, A.Fadly, 2020); M.Mubarak, et.al, 2020); (S.Syaiful, N.Wahid, 2020); (S.Syaiful, SW. Mudjanarko, 2019). Interruption of motorized vehicle traffic passing pedestrians will cause pedestrians to be uncomfortable, this must be prevented as soon as possible (S.Syaiful, Y.Elvira, 2017).

RESEARCH METHODS

The location of this research was conducted in the area of Ciuptat District Jalan Jombang Raya No 37 South Tangerang. The time of the research was conducted at 06.00 - 08.00 WIB, 11.00 - 13.00 WIB, and 16.00 - 18.00 WIB. Measurements were made on Monday, Tuesday.



Figure 1. Research Roads for Pedestrian Facilities and Public Transportation (Source: Google earth)

The stages of this research are shown in the form of a flow chart as follows:

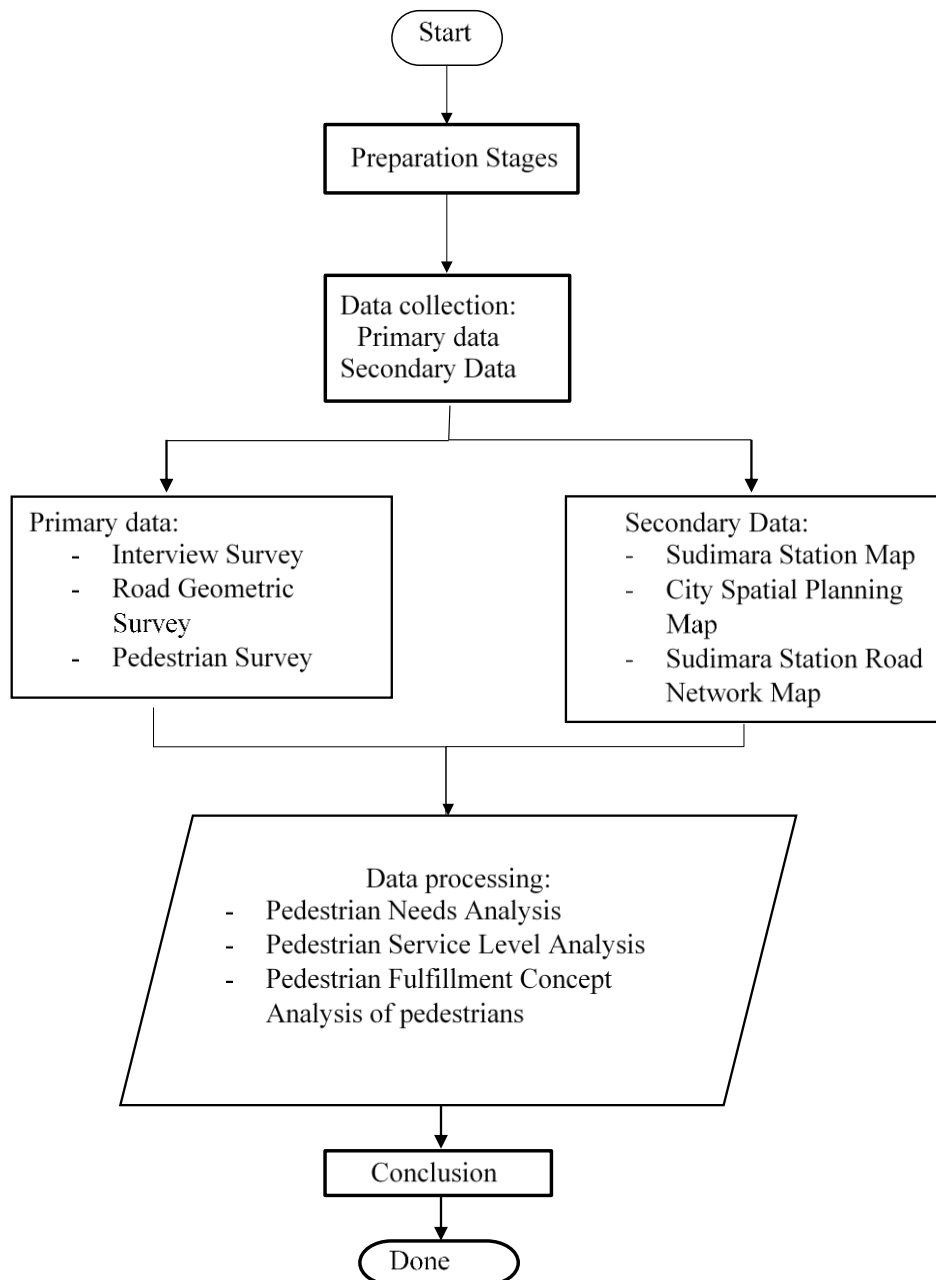


Figure 2. Research flow chart

RESULTS AND DISCUSSION

Pedestrian Characteristics Data at Sudimara Station

Pedestrian performance can be seen from surveys and observing conditions in the field directly. The pedestrian count data is calculated per 15 minutes during peak hours in a day. The location under review is the Sudimara station on Jalan Jombang Raya which is divided into five points, namely point A (Station), point B (Indomaret), point C (Pertamina), point D (Ruko), and point E (Toko

Baju). The following data on the number of pedestrians on July 5, 2020 at Sudimara Station, are shown in Table 1.

Table 1. Pedestrian harcter at sudimara Station

MORNING					
LOCATION	Jombang Raya A	Jombang Raya B	Jombang Raya C	Jombang Raya D	Jombang Raya E
6.00 - 6.15	2	22	15	20	16
6.15 - 6.30	3	42	35	20	16
6.30 - 6.45		25	12	7	2
6.45 - 7.00	1	25	14	16	13
7.00 - 7.15	2	23	11	7	5
7.15 - 7.30		12	9	7	7
7.30 - 7.45		41	11	11	7
7.45 - 8.00	1	21	6	7	11
8.00 - 8.15		31	16	6	6
8.15 - 8.30	2	17	5	8	7
8.30 - 8.45	3	26	6	14	9
8.45 - 9.00		16	8	11	5
Amount of Morning	14	301	148	134	104
EVENING					
16.00 - 16.15	2	9	8	12	3
16.15 - 16.30	8	24	10	3	4
16.30 - 16.45	1	34	14	6	4
16.45 - 17.00	2	37	9	4	4
17.00 - 17.15	6	31	10	10	4
17.15 - 17.30	3	28	8	9	4
17.30 - 17.45	3	54	17	17	12
17.45 - 18.00	2	47	3	4	1
18.00 - 18.15	2	27	6	2	
18.15 - 18.30		35	2	2	
18.30 - 18.45		48	10	2	2
18.45 - 19.00		34	3	2	4
Amount of Evening	29	408	100	73	42
Total	43	709	248	280	146
Average	3	30	11	9	7

(Source: Analysis results)

Based on the table shown a graph depicting the volume of pedestrians at Sudimara Station.

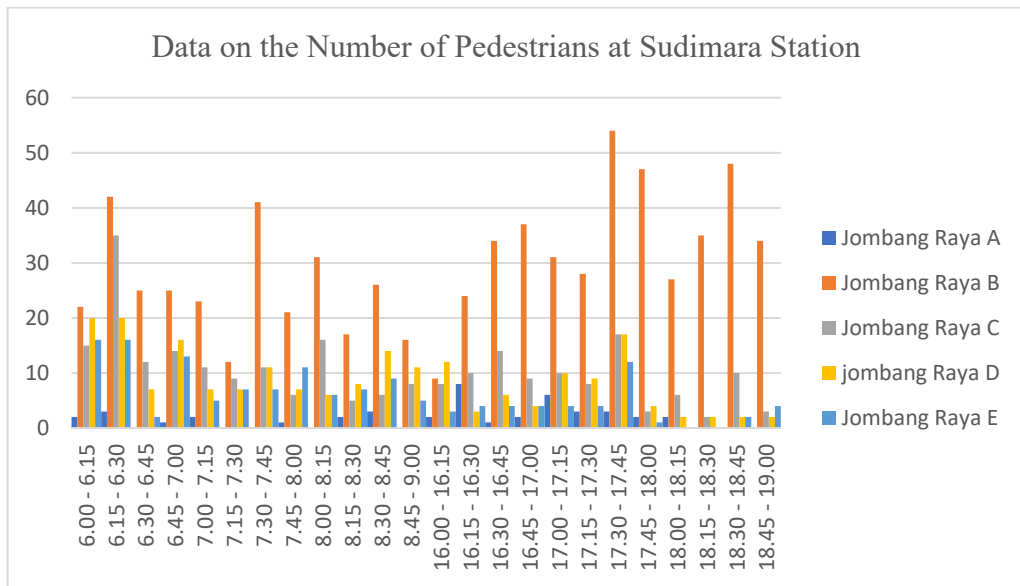


Figure 3. Graph of Pedestrian Volume Against Sudimara Station
(Source: Analysis Results)

Analysis of Pedestrian Facility Space Requirements at Sudimara Station

Based on data on the number of pedestrians at Sudimara Station, the analysis of pedestrian space requirements for 2020 and 2025 is shown in the table below:

Table 2. Analysis of Projection of Sidewalk Needs in 2020 and 2025

Location	Pedestrian Total Per day (2020)	Per Hour (2020) (hour)	Per minute (2020) (minute)	Side Walk Width Min (2025) (metre)	Per minute (2025)	Side Walk Width Min (2025)
A	43	8	1	1.5	2	1.6
B	709	119	2	1.6	3	1.6
C	248	42	1	1.5	2	1.6
D	207	35	1	1.5	2	1.6
E	146	25	1	1.5	2	1.6

(Source: Analysis Results)

Information:

1. The total number of pedestrians per day is the data on the number of pedestrians at Sudimara Station in one day.
2. Hourly data is data on the number of pedestrians at Sudimara Station in one hour.
3. The data on the number of pedestrians per minute is the number of pedestrians per minute.

4. The minimum sidewalk width (2020) is the minimum sidewalk width based on the Minister of Public Works and Housing Regulation No.3. 2014 in 2020.
5. Perminute (2025) is data on the number of pedestrians in one minute for projections in 2025.
6. The minimum curb width (2025) is the minimum curb width to be projected by 2025.

The calculation of road capacity based on MKJI 2017 is stated in the following table:

Pedestrian Service Level Analysis at Sudimara Station

Based on the data on the number of pedestrians that have been described, the analysis of pedestrian service levels carried out for 2020 and 2025 is shown in the table below:

Table 3. Service Level Analysis in 2020

Category 2020	Location				
	Jombang Raya A	Jombang Raya B	Jombang Raya C	Jombang Raya D	Jombang Raya E
Footpath (m2/person)	67	7	18	22	29
Average Velo City (metre/minute)	85	79	80	81	82
Volume Current (Person/Metre/Minute)	1	2	1	1	1
Volume/Capacity Rasio	0.0118	0.0253	0.0125	0.0123	0.0122
LOS	A	A	A	A	A

(Source: Analysis Results)

Table 4. Service Level Analysis in 2025

Category 2025	Location				
	Jombang Raya A	Jombang Raya B	Jombang Raya C	Jombang Raya D	Jombang Raya E
Footpath (m2/person)	76	8	21	25	33
Average Velo City (metre/minute)	97	90	91	92	94
Volume Current (Person/Metre/Minute)	1	2	1	1	1
Volume/Capacity Rasio	0.0134	0.0289	0.0143	0.0141	0.0139
LOS	A	A	A	A	A

(Source: Analysis Results)

Based on the analysis of pedestrian service level analysis in 2020 and 2025, the service level of Sudimara Station has met the provisions of PM PUPR NO.3 2014.

Analysis of the Concept of Pedestrian Fulfillment at Sudimara Station

In this study, the results of the analysis are obtained to determine the concept of pedestrian fulfillment at the Sudimara Station, namely by knowing the existing conditions at the Sudimara station which can be used as a reference before carrying out the construction of a good road mode integration facility.

Existing Condition of Sudimara Station

The existing condition at Sudimara Station still has a very low volume of pedestrians, this of course affects the desire of people to walk to Sudimara Station from public transport stops to Sudimara Station or vice versa. These conditions can be seen in the image below:



Figure 4. Existing Condition of Segment A Access Jalan Jombang Raya to Sudimara Station
(Source: Google Earth)

The existing condition of the pedestrian integration facility of Sudimara Station, there are no pedestrian obstacles and no pedestrian facilities. So that the current conditions have not met the conditions expected by the applicable standards.

Sidewalk Space Dimension Planning

Based on the analysis of pedestrian space requirements, analysis of pedestrian service levels, and the existing conditions around Sudimara Station, the authors plan sidewalk space dimensions as an alternative pedestrian facility around Sudimara Station. The planning is based on the provisions of PP. 34 of 2006 concerning Roads, Guidelines for Pd T-13-2004 B concerning Guidelines for the Installation of utilities at Road-Owned Facilities, and Guideline No. 33 / T / BM / 1996 concerning procedures for Road Landscape Engineering, and Guideline No. 011 / T / Bt / 1995 concerning Planning Procedures for Pedestrian Facilities in Cities.

Pedestrian Facilities are planned based on the following conditions:

1. The road classification is type II Class III, medium standard for roads with 2 lanes to serve transportation in a district at moderate speed, for intersections without traffic lights.
2. Sidewalks can be planned on roads where the volume of pedestrians is more than 300 people per 12 hours (6.00 - 18.00 hours) and more traffic volume and 1000 vehicles per 12 hours (6.00 - 18.00 hours).
3. The sidewalk free space is not less than 2.5 meters and the free depth is not less than one meter and the pavement surface. Side freedom of not less and 0.3 meters. The utility installation plan must not only fulfill the sidewalk free space but also must comply with the provisions in the utility installation manual.
4. The width of the sidewalk must be able to serve the volume of existing pedestrians. The minimum width of the sidewalk should be as indicated in the table according to the road classification.

Table 5. Minimum Sidewalk Width

Plan Road Classification	Minimum Standard (m)	Minimum Width (Exception)
Type II	Class I	1,5
	Class II	1,5
	Class III	1,0

(Source: PU Regulation No. 11 of 1995)

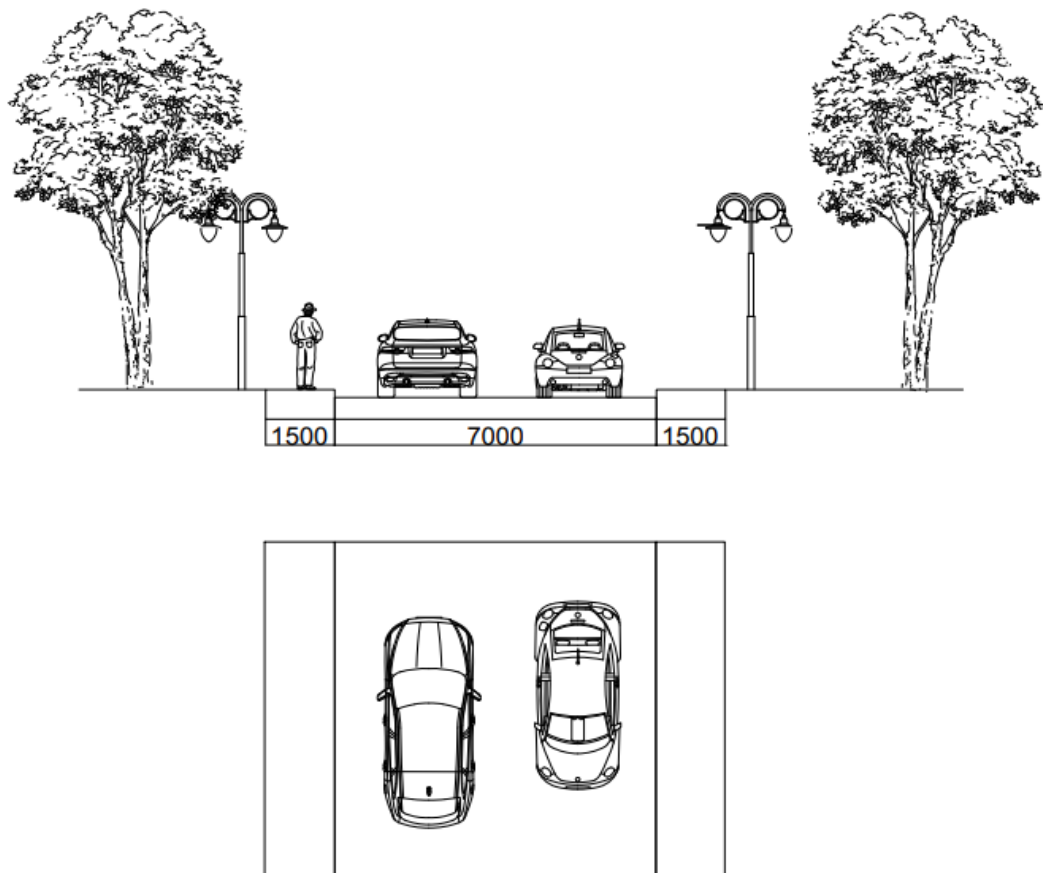


Figure 5. Existing Condition of Segment A Access Jalan Jombang Raya to Sudimara Station
(Source: Analysis Results)

The sidewalk dimension planning that the writer did at Sudimara station took into account the applicable provisions including the addition of the sidewalk width to 1.5 meters and the addition of road lighting facilities. The planning is described as the following specification.

Left pedestrian	: 1.5 m
Right pedestrian	: 1.5 m
Total shoulder of the road	: 0 m
Median	: 0 m
The road	: 7 m

CONCLUSION

From the need for sidewalk space at Sudimara Station in 2020 is a minimum of 1.5 - 1.6 m and the projection analysis of space requirements at the Sudimara station station in 2025 is a minimum of 1.6 m. The service level of pedestrian facilities at Sudimara stations in 2020 and 2025 is categorized as service level A, which means that pedestrians can walk freely, including being able to determine the direction of walking freely, with a relatively fast pace without causing interference between pedestrians. The existing conditions at Sudimara Station are lack of adequate special pedestrian facilities, many street vendors, buying and selling activities in supermarkets that hinder pedestrian facilities, and careless motorbike activities.

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