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Cyclist Safety and Comfort of Bicycle Facilities in the Bintaro Jaya During Covid-19 Pandemic Using Bicycle Level of Service

F. J. P. Sitorus[1*], G. Wulandari[2], R. Y. Nikijuluw[3]

[1*,2,3]*Civil Engineering Departement, Pembangunan Jaya University*

Email: [1*] *fredy.jhon@upj.ac.id* , [2] *galih.wulandari@upj.ac.id* , [3] *rioyohanesnikijuluw@gmail.com*

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A B S T R A C T

Limited cycling facilities are one of the problems that often occur in urban areas in Indonesia, especially Bintaro Jaya, an area that cyclists often traverse during the COVID-19 period as it is today. The lack of service level of bicycle facilities on Jl. Boulevard Bintaro Jaya often causes bicycle users to feel less safe and comfortable during cycling. This study was conducted to know the service of bicycle facilities in Bintaro, especially on jl. Boulevard Bintaro Jaya. The most affecting factor of the service level of bicycle facilities in Bintaro is the high volume of traffic. One of the first steps to knowing the level of service of bicycle facilities is to analyze using the bicycle level of service (BLOS) method. In addition, a questionnaire will be conducted to determine the perception of bicycle facility users in Bintaro. Observations on traffic characteristics are carried out on weekdays and weekends, which are then to obtain BLOS data. Analysis was performed that BLOS values above 3.5 which mean the bike is not feasible for cyclists. The results concluded that the bicycle facilities in Bintaro Jaya are still not by the safety and comfort factors according to the BLOS method. To improve the safety and comfort of cyclists, the application of traffic calm such as speed hum is needed to reduce the impact of high traffic volume and high speed, repainting of markings and adding bicycle parking facilities.

1. Introduction

One of the urban areas experiencing rapid development is Bintaro Jaya, located in South Tangerang. Bintaro Jaya is an independent city growing dynamically into a residential and commercial area, with transportation networks connected to Jabodetabek and public transportation systems such as commuter trains and buses. Rapid urban development can have implications for the provision of infrastructure to support the needs of urban communities [1]. The recent development concept is needed to develop and improve urban infrastructure and service facilities and enable business activities[2].

Density can impact urban infrastructure services through external factors such as lifestyle [3]. One of the lifestyle phenomena that is becoming a trend, especially during the Covid-19 pandemic, is cycling. An increasing number of people are using bicycles daily [4]. In addition, cycling exercise is considered to ward off boredom at home [5]. Improvement of bicycling infrastructure is expected to increase bicycling and foster concomitant environmental sustainability and health benefits [6]. During the Covid-19 pandemic, many new regulations were intended to eradicate the Coronavirus. This policy greatly affects the transportation sector because people's mobility will decrease and impact the choice of transportation modes. The presence of pedestrians and cyclists needs to be supported by adequate facilities, affecting many factors.

Furthermore, adequate bicycle infrastructure is the most crucial factor for people who frequently cycle for sports. At the same time, traffic safety and security are the most critical factors for those who cycle to work [7]. However, experienced cyclists were more motivated by a passion for cycling [8]. Cycling has been widely recognized as one of the best environmentally friendly modes of transport [9].

Furthermore, the bicycle path, especially in Bintaro, is still integrated on the road with other public traffic. The division in several road sections is only limited by white lines and drawings on the road. However, the problem that will be faced from the movement of the Bicycle itself is the low level of safety for bicycle users and other traffic users, which affects the reduced capacity of the road and the amount of delay at the intersection. In addition, other problems are the low security and orderliness of bicycle parking, low traffic discipline on public roads, the lack of requirements and completeness of cycling safety, and the unavailability of good bicycle movement facilities. Therefore the existing bicycle facilities need to be evaluated based on LOS, especially bicycles [10]. To support cycling activities, it is necessary to provide special bicycle lanes on each road section that are safe and comfortable for cyclists. Hence, order to develop a safe bicycle lane requires supporting factors. In India, to develop a bicycle safety index model using variables like bicycle volumes, bicycle speed, bicycle markings, and bicycle safety rating [11][12]. Some efforts to improve bicycle facilities include providing bicycle-sensitive loop detectors in new installations and retrofitting where needed, free parking for bicycles, planting trees on bike paths[13]

Several methods have been developed to assess the quality of bicycle lanes, such as BLOS, BCI, and Guttman's method. Previous studies have shown similar results between these methods [14]. In Metro City, Guttman's method for bike lanes resulted in 55,55%, which is suitable for use [15]. Another approach can be obtained with a GIS application showing which

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road segments of the traffic network need to be upgraded or not for cycling. [16]. Increased studies on cyclist behavior will help improve the quality of road services [17][21].

Based on the current conditions on Bintaro Boulevard Street, it is necessary to study traffic characteristics, especially bicycles, as a first step to finding solutions to the problem of movement of bicycle users in the Bintaro area. Thus, this study is expected to determine the level of service of bicycle facilities (Bicycle Level Of Service) and evaluate the availability of special bicycle facilities by considering the factors of security, safety, and order for bicycles and other road users.

2. Research Method

LOS concept is linked to transport comfort from the user's perspective. By knowing users' perceptions of bicycles, lane facility planning could be better than existing bicycle infrastructure design practices [18]. The average value of each attribute is multiplied according to the answer category of all respondents and then divided by the number of respondents. Therefore, to evaluate bicycle lane facilities, analysis of the perception of bicycle lane users and the level of safety based on the BLOS method [19]. By comparing the two results, using a quantitative method approach, an overview of the condition of the existing bicycle lane facilities will be obtained [20]. Survey data in this paper is used to determine the perceived cycling environment and current travel behavior, and socio-demographic variables for respondents' attitudes. Respondents were obtained based on a random sampling method of cyclists passing through the bicycle lane. The population is defined as cyclists, where the number of respondents is determined based on the solving formula from observations of the daily average number of users. The variables used in this study consisted of the independent and dependent variables. The independent variables included vehicle volume, bicycle lane width, condition of facilities for cyclists, and community of bicycle ownership around Bintaro [21]. In addition, the dependent variable is the level of service of bicycle facilities and public perception of bicycle facility services on Bintaro Jaya Boulevard Street.

2.1 Data Collection

Primary data was obtained by observation methods consisting of geometric measurement techniques, observations of traffic flow characteristics,s and the distribution of questionnaires to bicycle users in the Bintaro area. Observations of the study object were carried out at 2 locations: the road segment with bicycle lane facilities integrated with traffic lanes and bicycle lane facilities integrated with pedestrian lanes. The data collection in this study was carried out by observing the existing conditions, such as the size of the bicycle lane, the volume

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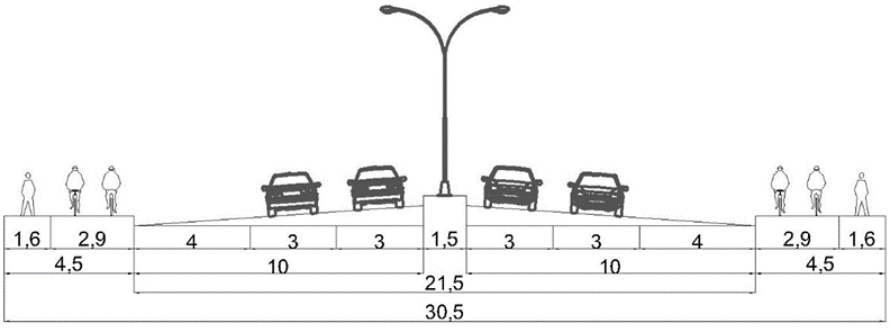
of vehicles, the geometric conditions of the road, the measurement of traffic flow characteristics carried out on weekdays and holidays with the observation time is 06:00-08:00 WIB), afternoon session (12:00-14:00 WIB) and afternoon session (16:00-18:00 WIB) In this study, a perception survey of 100 participants were carried out to answer their perceived satisfaction on study satisfactions under peak hour conditions. In contrast, the geometric measurements of the road obtained data on the cross-sectional dimensions of the road, length of the road segment, median, shoulder, Bicycle facilities, pavement condition, and road capacity can be calculated using the 1997 MKJI method [22]**.**

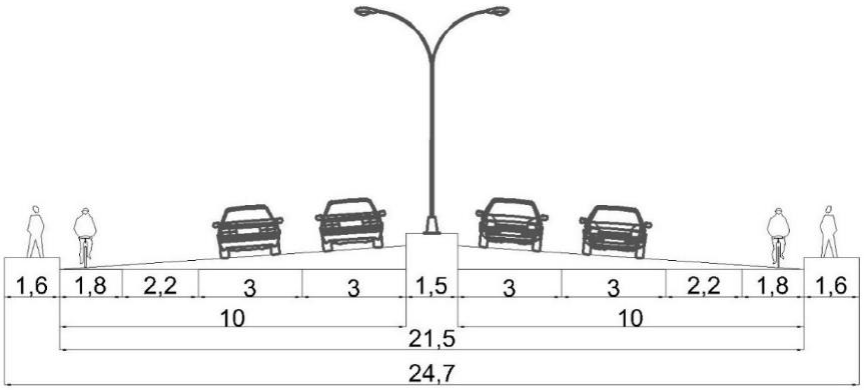
2.2 Geometric Conditions of Bicycle Lines

Boulevard Bintaro Street is a commercial area where at the research location, there are commercial places such as shopping centers (markets, shops, supermarkets), hospitals, restaurants, and other facilities that support public interests. From the results of observations in the field, Boulevard Bintaro Street is a type of road with a 6 lane 2-way divided configuration where the lane's width per direction is 10 meters. Each lane has one bicycle lane, most of which are integrated with pedestrians, and some points are on the shoulder of the road. Based on these conditions, there are 2 types of bicycle lanes, namely Type A and Type C [23]



Sources: Research Documentation (2021)

Figure 1. Bike Lane Integrated with Pedestrian



Sources: Research Documentation (2021)

Figure 2. Bike Lane Integrates With Traffic Lane

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Figure 1. shows the existing condition of the bicycle lane integrated with the pedestrian path on Jalan Boulevard Bintaro, and **Figure 2.** shows the existing condition of the bicycle lane integrated with the traffic lane.

2.3 Bicycle Level Of Service (BLOS)

Bicycle Level Of Service (BLOS) is an analysis that is used in bicycle service level research to know the conditions of cycling on the road and also represents an evaluation of safety for bicyclists [14][24][25]. Level bicycle service required traffic volume, traffic speed, percentage of heavy vehicles, pavement condition road, the width of available pavement for bicycles, and the number of lanes in one direction of travel. The BLOS method uses six scale ranges to describe the quality of the road segment for a bicycle trip from best to worst condition based on user perception, as shown in **Table. 1**

Table 1. Description of BLOS Ratings

BLOS Value	BLOS Ratings	Description
< 1.5	A	Excellent environment for Bicycle
1.5 – 2.5	B	Good environment for Bicycle
2.5 – 3.5	C	Passably environment for Bicycle
3.5 – 4.5	D	Poorly environment for Bicycle
4.5 – 5.5	E	More Poorly environment for Bicycle
> 5.5	F	Unsafe environment for Bicycle

Source: Highway Capacity Manual [26].

The formula for calculating service level bicycle is as follows:

$$BLOS = 0{,}760 + Fv + Fs + Fw + Fp$$

Where:

Fv = Volume factor,

Fs = Speed factor,

Fp = Pavement condition factor,

Fw = Cross section factor.

The quality of the roads used for bicycle facilities can be classified based on user perceptions where A is a very good environmental condition for cycling and F is an uncomfortable environment for bicycles. At the same time, distributing questionnaires with a random sampling method was carried out to obtain the characteristics of bicycle users and perceptions of the bicycle lane facilities used. The number of respondents was determined using the Slovin formula based on the population of South Tangerang residents.

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3. Results and Discussions

3.1 Characteristics of Respondents

Based on a questionnaire conducted on 100 respondents, 65% of respondents have an undergraduate degree education background, 48% of respondents are private employees. In contrast, in terms of the characteristics of bicycle users, 32% of respondents use a bicycle at least 1 time a week, and 37% of respondents use this type of folding bicycle bike. Based on using bicycles on Boulevard Bintaro Street, 69% of respondents use bicycles for exercise. As many as 42% of respondents choose convenience considerations to use the bicycle lane facility on Boulevard Bintaro Street, and 43% of respondents cycle 7-9 km. Meanwhile, from the time of using the bicycle lane facility, most respondents did cycling activities in the morning and evening, respectively, with 34% and 36%, with an average duration of cycling between 30-60 minutes.

Table 2. Respondent satisfaction Level.

No	Statement	Response				Satisfaction Level Score
		STS (1)	TS (2)	S (3)	SS (4)	
1	The bike path surface is decent (smooth surface, no cracks, no puddles)	1	20	68	11	2,89
2	Green open space (RTH) around the bicycle path is adequate (with a width of +/- 1.5 m, and the type of plant is shade plants)	3	22	64	11	2,83
3	The lighting is decent (with a distance between lighting lamps of +/- 10 meters)	3	30	61	6	2,70
4	Marks, signs,s and information boards can provide instructions for bicycle users and use good materials.	0	11	74	15	3,04
5	There are rest areas and bicycle parking spaces around Boulevard Bintaro Jaya Stree,t which is by the COVID-19 Health Protocol.	7	45	46	2	2,43
6	Special bicycle lanes are used properly according to their use	3	21	60	16	2,89
7	Bike lanes may be used as spaces for other vehicles such as motorbikes, cars, and other vehicles to stop or park.	65	28	7	0	1,42
8	The dividing line for the bike path is quite informative and visible.	2	17	70	11	2,90

Source: Research Document (2021)

The perception of respondents' satisfaction with the condition of the bicycle lane on Boulevard Bintaro Jaya Street shows an average score of 2,1 on all attributes of the question.

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This indicates that the respondents adequately assessed the bicycle lane facilities. However, the statement "bike lanes may be used to be space for other vehicles such as motorbikes, cars and other vehicles. others to stop or park" gets a score of 1,42, which means that the respondents do not agree with the statement, as shown on **Table 2.**

Boulevard Bintaro street has quite heavy traffic with relatively high speeds of cars and motorbikes. One of the things that have been attempted is to apply the concept of traffic calming through speed hum. At the same time, for the convenience of cyclists, it is necessary to repair road markings and signs for safety and widen outside through lanes or add bike lanes by either redistributing space on the roadway by restriping or adding paved width. While to solve the problem at the intersection, provide bicycle-sensitive loop detectors in new installations and retrofit where needed. According to the questionnaire results, the addition of a bicycle parking area adapted to land use conditions along the boulevard Bintaro Street. Furthermore, investments in facilities such as free parking for bicycles, and strategies such as planting trees on bike paths and sidewalks to provide shade, can significantly encourage cycling. Furthermore, investments in facilities such as free parking for bicycles, and strategies such as planting trees on bike paths and sidewalks to provide shade, can significantly encourage cycling.

3.2 Traffic Characteristic

From the results of observations of traffic conditions on Boulevard Bintaro Jaya Street, in the direction of Jakarta/Pondok Aren and the direction of Graha Raya, obtained Vehicle speed were as follows:

Table 3. Vehicle speed on Jln. Boulevaed Bintaro in the direction of Jakarta /Pondok Aren

Day	Observation Hours	Range (km)	Travel Time (minutes)				Speed (km/hour)			
			Motor cycle	Car	Pedest rian	Bicycle	Motor cycle	Car	Pedest rian	Bicycle
Mon day	06.00-08.00	4.21	5.23	5.65	81.75	8.14	48.26	44.71	3.09	31.02
	12.00-14.00	4.21	5.26	4.65	46.01	33.11	48.01	54.36	5.49	7.63
	16.00-18.00	4.21	5.11	4.67	24.45	8.21	49.47	54.14	10.33	30.76
Satur day	06.00-08.00	4.21	4.63	4.93	48.58	9.99	54.55	51.22	5.20	25.28
	12.00-14.00	4.21	6.23	6.26	191.36	16.52	40.52	40.32	1.32	15.29
	16.00-18.00	4.21	4.94	5.31	26.29	7.72	51.16	47.56	9.61	32.74
Sunday	06.00-08.00	4.21	4.69	5.76	53.74	9.40	53.85	43.83	4.70	26.87
	12.00-14.00	4.21	5.43	5.87	66.65	22.82	46.49	43.04	3.79	11.07
	16.00-18.00	4.21	5.41	4.71	42.10	7.02	46.66	53.60	6.00	35.98

Source: Research Document (2021)

The speed of four-wheeled vehicles in the direction of Jakarta/Pondok Aren ranges from 40-55 km/hour. The speed ranges from 44-55 km/hour for two-wheeled vehicles. Meanwhile, the speed of cyclists shows that the speed ranges from 5-35 km/hour.

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Table 4. Vehicle speed on Jln. Boulevard Bintaro in the direction of Graha Raya

Day	Observation Hours	Range (km)	Travel Time (minutes)				Speed (km/hour)			
			Motor cycle	Car	Pedest rian	Bicycle	Motor cycle	Car	Pedest rian	Bicycle
Mon day	06.00-08.00	4.21	5.88	6.24	41.48	8.94	42.98	40.51	6.09	28.25
	12.00-14.00	4.21	5.62	5.96	47.93	8.12	44.92	42.40	5.27	31.12
	16.00-18.00	4.21	8.08	9.70	29.10	6.75	31.27	26.03	8.08	37.44
Satur day	06.00-08.00	4.21	5.28	5.86	42.67	7.23	47.85	43.14	5.92	34.95
	12.00-14.00	4.21	5.52	5.86	45.27	13.96	45.78	43.10	5.62	18.10
	16.00-18.00	4.21	6.96	8.81	32.68	10.25	36.30	28.66	7.73	24.65
Sunday	06.00-08.00	4.21	5.31	6.96	42.81	9.29	47.61	36.31	5.90	27.18
	12.00-14.00	4.21	5.64	6.36	89.89	8.37	44.79	39.72	2.81	30.18
	16.00-18.00	4.21	5.13	6.17	37.98	9.50	49.24	40.97	6.65	26.59

Source: Research Document (2021)

The speed of four-wheeled vehicles in the direction of Graha Raya ranged from 25-45 km/hour. The speed ranges from 30-50 km/hour for two-wheeled vehicles. Meanwhile, the speed of cyclists shows that the speed ranges from 15-35 km/hour. Boulevard Bintaro street has quite heavy traffic with relatively high speeds of cars and motorbikes.

3.3 Bicycle Lanes Effective Rate

The results of the BLOS method analysis for both directions of the travel show that the level of service from the existing bicycle lane facilities shows a lack of compliance with the safety aspects.

Table 5. BLOS Level Jl. Boulevard Bintaro Jaya (Bike Lane Integrates With Traffic Lane) in Both Directions.

The direction of Jakarta/Pondok Aren Range (The Bicycle lane is integrated with the motorized vehicle lane)								
Day	Hour	Constanta	Fv	Fs	Fp	Fw	BLOS Score Rating	
							Letter	Number
Mon day	06:00-08:00	0,76	3,25	0,96	0,44	-0,7	D	3,95
	12:00-14:00	0,76	3,23	1,02	0,44	-0,7	D	3,99
	16:00-18:00	0,76	3,30	0,97	0,44	-0,7	D	4,01
Satur day	06:00-08:00	0,76	3,07	1,05	0,44	-0,7	D	3,86
	12:00-14:00	0,76	3,25	0,87	0,44	-0,7	D	3,86
	16:00-18:00	0,76	3,43	0,94	0,44	-0,7	D	4,11
Sunday	06:00-08:00	0,76	2,87	0,97	0,44	-0,7	D	3,58
	12:00-14:00	0,76	3,14	0,90	0,44	-0,7	D	3,78
	16:00-18:00	0,76	3,30	0,95	0,44	-0,7	D	3,99
The direction of Graha Raya (The Bicycle lane is integrated with the motorized vehicle lane)								
Day	Hour	Constanta	Fv	Fs	Fp	FW	BLOS Score Rating	
							Letter	Number
Mon day	06:00-08:00	0,76	3,24	0,88	0,44	-0,7	D	3,86
	12:00-14:00	0,76	3,27	0,94	0,44	-0,7	D	3,95
	16:00-18:00	0,76	3,39	0,72	0,44	-0,7	D	3,85
Satur day	06:00-08:00	0,76	3,25	0,95	0,44	-0,7	D	3,94
	12:00-14:00	0,76	3,41	0,93	0,44	-0,7	D	4,08
	16:00-18:00	0,76	3,82	0,79	0,44	-0,7	D	4,35
Sunday	06:00-08:00	0,76	3,12	0,94	0,44	-0,7	D	3,80
	12:00-14:00	0,76	3,40	0,89	0,44	-0,7	D	4,03
	16:00-18:00	0,76	3,74	0,92	0,44	-0,7	D	4,40

Source: Research Document (2021)

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According to **Table 5.** the bicycle lane on Boulevard Bintaro Jaya Street for bicycle lanes that are integrated with traffic lanes on Mondays, Saturdays, and Sundays has a BLOS rating of "D" with a value of more than 3.5, meaning the environment is not safe for bicycles (unacceptable by cyclists) but can still be done cycling activity with moderate intensity. The results of calculations using the Bicycle Level of Service method for Boulevard Bintaro Jaya Street, whose bicycle lanes blend into the traffic lane.

Table . 6 BLOS Level Jl. Boulevard Bintaro Jaya (Bike Lane Integrates With Pedestrian Lane) in both Direction

The direction of Jakarta/Pondok Aren Range (The Bicycle lane is integrated with the pedestrian lane)								
Day	**Hour**	**Constanta**	**Fv**	**Fs**	**Fp**	**Fw**	**BLOS Score Rating**	
							Letter	**Number**
Monday	06:00-08:00	0,76	3,25	0,96	0,44	-0,83	D	3,82
	12:00-14:00	0,76	3,23	1,02	0,44	-0,83	D	3,86
	16:00-18:00	0,76	3,30	0,97	0,44	-0,83	D	3,88
Saturday	06:00-08:00	0,76	3,07	1,05	0,44	-0,83	D	3,73
	12:00-14:00	0,76	3,25	0,87	0,44	-0,83	D	3,73
	16:00-18:00	0,76	3,43	0,94	0,44	-0,83	D	3,98
Sunday	06:00-08:00	0,76	2,87	0,97	0,44	-0,83	C	3,45
	12:00-14:00	0,76	3,14	0,9	0,44	-0,83	D	3,65
	16:00-18:00	0,76	3,30	0,95	0,44	-0,83	D	3,86
The direction of Graha Raya (The Bicycle lane is integrated with the pedestrian lane)								
Day	**Hour**	**Constanta**	**Fv**	**Fs**	**Fp**	**FW**	**BLOS Score Rating**	
							Letter	**Number**
Monday	06:00-08:00	0,76	3,24	0,88	0,44	-0,83	D	3,73
	12:00-14:00	0,76	3,27	0,94	0,44	-0,83	D	3,82
	16:00-18:00	0,76	3,39	0,72	0,44	-0,83	D	3,72
Saturday	06:00-08:00	0,76	3,25	0,95	0,44	-0,83	D	3,81
	12:00-14:00	0,76	3,41	0,93	0,44	-0,83	D	3,95
	16:00-18:00	0,76	3,82	0,79	0,44	-0,83	D	4,22
Sunday	06:00-08:00	0,76	3,12	0,94	0,44	-0,83	D	3,67
	12:00-14:00	0,76	3,40	0,89	0,44	-0,83	D	3,90
	16:00-18:00	0,76	3,74	0,92	0,44	-0,83	D	4,27

Source: Research Document (2021)

According to **Table 6.** bicycle lanes that are integrated with pedestrians (pedestrian lanes) on Mondays, Saturdays, and Sundays, the BLOS score is "D" with a value of more than 3.5, meaning the environment is not safe for bicycles (unacceptable by cyclists). However, cycling activities can still be carried out with an intensity not too high. However, on Sunday, the direction of Jakarta/Pd. At 06:00-08:00, WIB received a BLOS rating of "C" with a value of 2.5 - 3.5, which means the environment is quite good for bicycles. The results of calculations using the Bicycle Level Of Service method for Boulevard Bintaro Jaya Street, in which bicycle lanes are integrated with pedestrians

The results of the analysis of the effectiveness of bicycle facilities on Boulevard Bintaro Jaya Street using the Bicycle Level Of Service method on Monday, Saturday, and Sunday obtained the BLOS "D" predicate, which means the environment is not safe for

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bicycles. Several factors cause this. One of them is traffic density, resulting in the large volume of motorized vehicles dominated by private motorized vehicles and the high traffic activity on Boulevard Bintaro Jaya Street. Hence, cyclists still experience uncomfortable cycling, especially in the afternoon when traffic volume reaches its highest peak.

The main priority in handling bicycle lanes is the comfort and safety factors for bicycle users. These two factors are very influential in making cyclists comfortable on Boulevard Bintaro Jaya Street, South Tangerang City.

3.4 Condition of Bicycle Lanes and Supporting Facilities

Based on the results of the BLOS, it is also necessary to observe the condition of the supporting infrastructure that meets the applicable standards in Indonesia regarding the guidelines for providing bicycle lanes which refers to the Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 59 of 2020 Bicycle lanes can be shared with pedestrians, which must pay attention to pedestrian safety with adequate capacity. Bicycle lanes share roads with motorized vehicles, using the shoulder of the road. Field observations include aspects of lane sharing, width, traffic sign, marking, and results, as shown in **Figure 3.**

Source: Research Documentation.

Figure 3. The results of field observations based on Bicycle Lanes Type

From **Figure 3, most** of the bicycle lanes are separated from the road and integrated with pedestrians, but several lanes are still attached to the shoulder of the road.

The installation of traffic signs has complied with the regulation, where the minimum height of traffic signs is 2.5 m (as shown in **Figure 4.**)

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Source: Research Documentation.

Figure 4. The results of field observations are based on Traffic signs' conditions.

The existing traffic signs in the form of bicycle lane direction boards are words and symbols of bicycle images, which are by the standards.

Regulation of the Minister of Transportation of the Republic of Indonesia No. PM 59 of 2020, Article 13, For roads without traffic barriers, the minimum width of the bicycle lane is 1.2 m. If there is parking for vehicles on the road using special parking markings, the bicycle lane must be located between the parking area and the motorized vehicle lane with a width of 1.5 m.

Source: Research Documentation.

Figure 5. The results of field observations are based on lane width blends with the shoulder.

The average bicycle lane width is 1.8 meters, and there are no special parking markings. But the paint used has started to fade, and the markings are no longer visible.

The average bicycle lane width meets the specified criteria based on the existing condition, but the sign and marking road have not been visible. So it needs to be maintained,

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such as repainting, so that the bike path can be seen clearly and gives a sense of safe and comfortable for bicycle lane users. The same condition can also be seen for bicycle lanes integrated with pedestrian paths where the width has met applicable standards Geometric Planning Standards for Urban Roads 1992. The minimum width of the bicycle lane is 2.0 m. The minimum width for bicycle and pedestrian paths is 3.5 m for type II, class I, and class II roads (as shown in **Figure 6.**)

Source: Research Documentation.

Figure 6. The results of field observations based on Bicycle Lanes Type.

According to the standards, the average bicycle lane width is 2 m – 3 m with type C lane conditions blending with pedestrians and according to the standards.

Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 34 of 2014 concerning Road Marking, The Emblem Marking is an image of a white bicycle and a green road marking. Bicycle lane markings have a length of at least 3 meters and a width according to the width of the road lane. And the distance between the markers is 6 meters. Bike lane markings are set on the left side of the traffic direction and installed on lanes that can be used simultaneously with other general traffic. The cyclist crossing markings are in the form of 2 dotted lines in a square or rhombus.

Source: Research Documentation.

Figure 7. The results of field observations are based on Bicycle Lanes Type.

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The available emblems are a white bicycle and light blue road markings. The bicycle lane markings available are standard, with a length of 3 meters and a distance between markers of more than 6 meters. Bike lane markings are located on the left side of the road and blend with pedestrians. However, there is a lane that blends with the shoulder of the road with markings that are not up to standard. The bicycle crossing markings are in the form of a red square with a width of 1.8 meters. The condition of the markings on the bicycle lanes in Bintaro has met the specified criteria, but it is not visible, so it needs to be repaired by repainting. (as shown in **Figure 7**)

4. Conclusion

The level of effectiveness for bicycle lanes in the corridor of Boulevard Bintaro Jaya Street, South Tangerang City, by using the Bicycle Level Of Service (BLOS) method, it is found that the average BLOS rating is "D" with a value of more than 3.5 which means the environment is less suitable for cycling (unacceptable by cyclists). Based on the questionnaires that have been distributed to the respondents, it can be concluded that the bicycle facilities on Boulevard Bintaro Jaya Street are quite satisfying for cyclists. However, it is necessary to improve and add bicycle facilities such as resting places and bicycle parking along the bicycle path of Boulevard Bintaro Jaya Street.

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