Performance Evaluation of Paid Parking at Cilebut Station

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ABSTRACT

This study intends to find out the capacity of parking needs managed by PT. Kereta Api Indonesia (Persero) with the location of the Cilebut station research, this study used the SRP method of characteristics (Volume, Accumulation, Duration, Turnover, Index), in this study was the management of paid parking performance. Data collection was carried out using the survey method with a time of 12 hours and running for sixteen days, with the aspects taken being data on the hours of entry and exit of the vehicle to find out the characteristics of the parking. The results of this study show that the parking performance cannot accommodate motorcycle vehicles the area with an area of 486m2 has a parking capacity of 120 SRP, while the results of the study getting an index figure of more than 100% indicates too high parking performance and so turn over parking by 181% at peak hours. The result of the SRP needs that must be provided by the management with the results of the study is 159 slots to accommodate motorcycle vehicles, with an SRP value of 159 slots will produce good parking performance, namely parking according to the slots that have been provided so that motorcycle vehicle users feel safe when parking the vehicle.

Keywords: parking; Parking Space Unit (SRP); parking space needs; parking capacity; Cilebut Station.

INTRODUCTION

PT. PT. Kereta Api Indonesia (Persero) is one of the state-owned companies engaged in transportation. PT. Kereta Api Indonesia (Persero) is divided into several operating areas ranging from Java and Sumatra Daop 1 Jakarta, Daop 2 Bandung, Daop 3 Cirebon, Daop 4 Semarang, Daop 5 Purwokerto, Daop 6 Yogyakarta, Daop 7 Madiun, Daop 8 Surabaya, Daop 9 Jember, Divre 1 Medan, Divre 2 Padang, Divre 3 Palembang, and Divre 4 Tanjungkarang (PT. Kereta Api Indonesia (Persero) Unit Architecture & Preservation, 2017; Salam RAMQ, 2020).

According to the Author To overcome this, of course, it is necessary to evaluate the current parking performance as a plan, so that it can provide an alternative parking control for Cilebut Station so that there are no more motorcycle vehicles that do not get parking spaces. It certainly also aims to realize comfort, security, and smooth parking at Cilebut Station (Ade A, 2019; Amanullah DR, 2020; Abdillah M, 2019).

Parking activities depend on the activities of the surrounding residents. Parking facilities that are most frequently used in Indonesia are markets, recreation areas, and schools including campuses and supermarkets. This parking activity is very important because Indonesian residents use means of transportation that require parking space. Some of these parking lots are free without payment, but some are paid. Paid parking can be found at several locations mentioned above (Ganda CF et.al, 2019; Karimah H, Akbardin J, 2019; Syaiful S et.al, 2022; Syaiful S et.al, 2022).

Motorized vehicles at low speeds always carry out activities below those required. This requirement also applies when entering the place/parking area. This area aims to control the speed of each vehicle that will be parked as well as to make the atmosphere of the parking area comfortable and safe from noisy activities. This parking activity is related to the activities of motorbike riders and their private vehicles to find a suitable parking space (Syaiful S, Rusfana H, 2022; Syaiful S, Pratama Y, 2019; Syaiful S, Hariyadi D, 2019). This land depends on the size of the parking area which can accommodate vehicles that will use more parking space. The use of parking lots both in designated locations and parking lots that have not been determined but are used for parking activities for

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motorized vehicles is part of the program that has been determined (Syaiful S et.al, 2020; Syaiful S, Fadly A, 2020; Syaiful S et.al, 2021; Syaiful S et.al, 2023).

Good parking activities are strongly supported by the driver's behavior in using the land as well as possible. This activity is a consequence of parking by the parking lot designation. Vehicle speed in the parking area must not be too high. Vehicles use the speed according to the signs in the designated parking area (Syaiful S et.al, 2023; Syaiful S et.al, 2023; Syaiful S et.al, 2023; Pratama FA et.al, 2023).

RESEARCH METHODS

Research Location

The research was conducted at Cilebut Station, East Cilebut, Sukaraja District, Bogor Regency. The research was carried out within 4 months, starting from August 1, 2022, to November 30, 2022. Time. The implementation of this study was carried out for four weeks, one week conducting research in four days, namely Monday, Tuesday, Wednesday, and Thursday at 06.00 – 18.00 WIB, the following can be seen in Figure 1 of the research location.

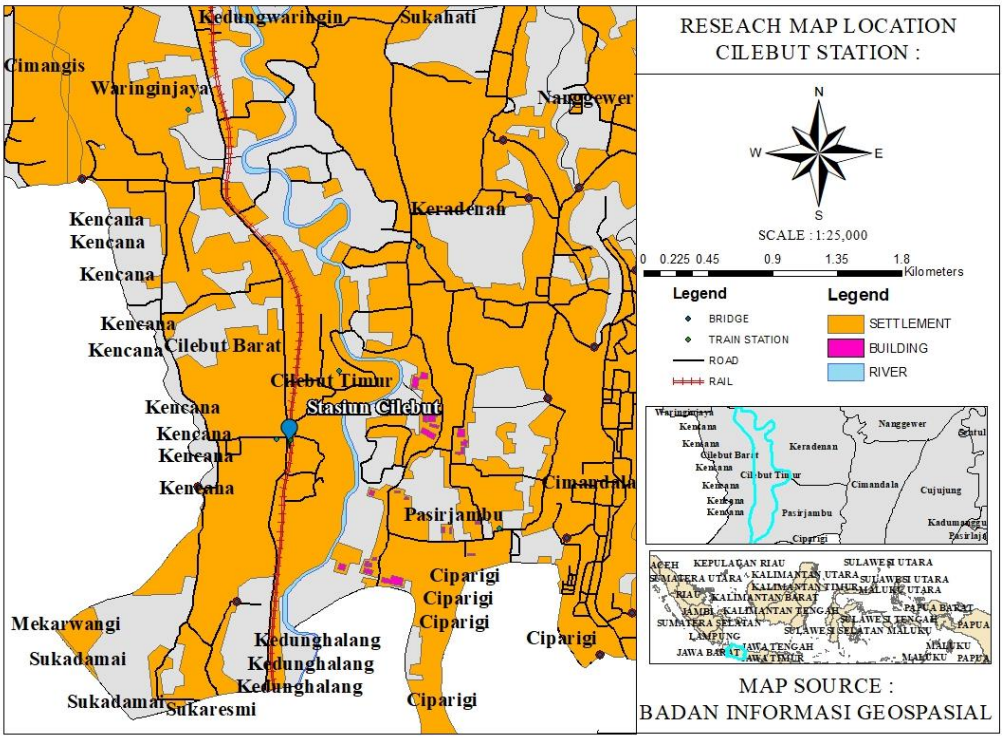

Figure 1. Location Map Source: BIG

Data Collection Methods

Literature Method

This method is carried out by collecting, identifying, and processing the written data obtained.

Observation Method

That is a method that is carried out by surveying directly into the field. The survey method carried out in this study is a recording of the number of vehicles and the duration of parking in the Cilebut Station parking area for entry and exit directions.

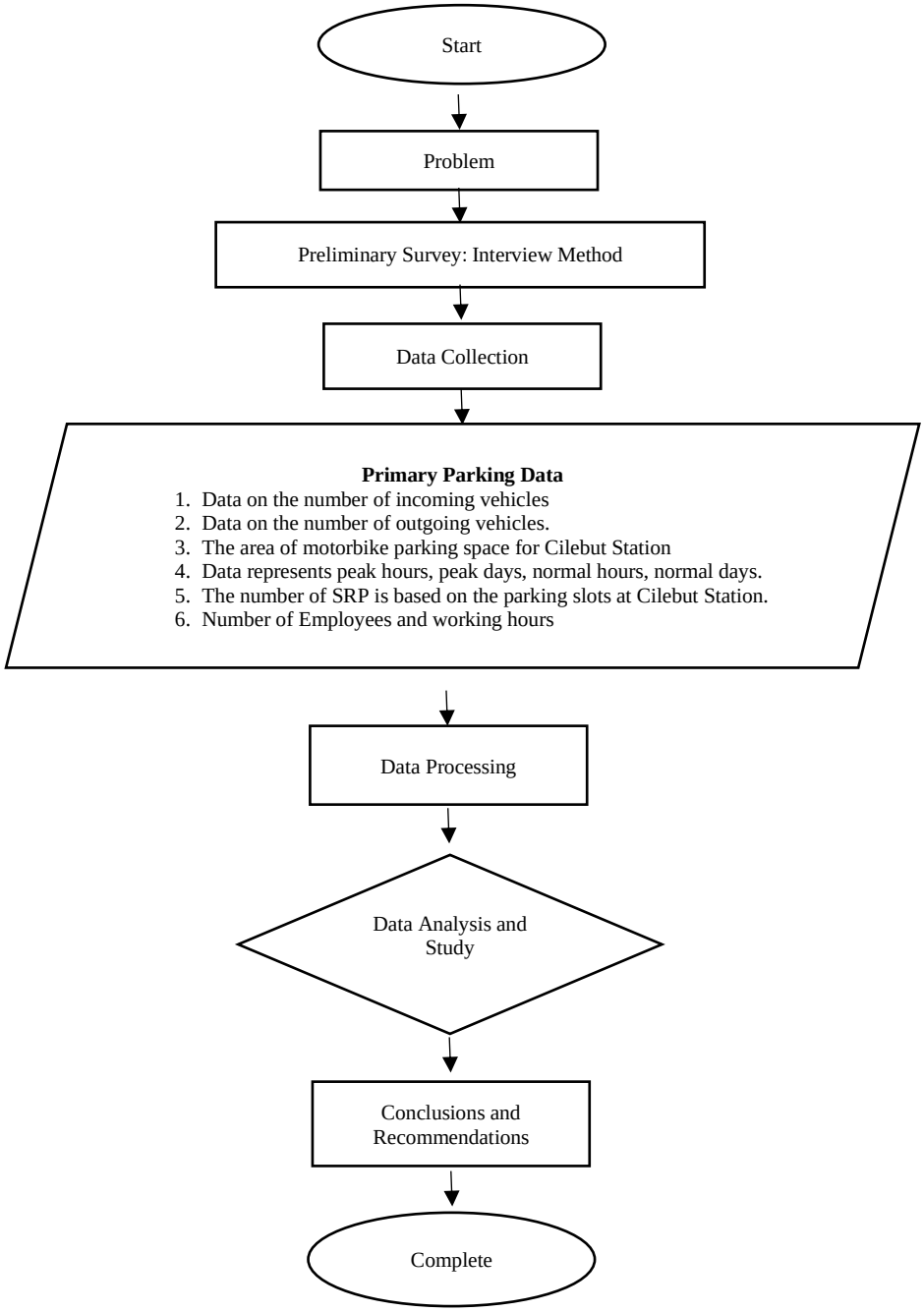

Figure 2. Flowchart

Data Analysis Methods

In conducting a study, an arrangement of research steps will be needed first to make it easier to analyze. In this study, it is necessary to plan the steps taken so that the research process can be carried out effectively. Here are the steps in the research:

1. Primary data in the form of vehicle license plate data and the time matched between entering and leaving the vehicle using the equation of the formula approach will obtain the results of parking characteristics and parking space needs.

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2. The data mentioned above is then grouped per unit time group, which is 30 minutes, then calculate the number of vehicles according to the time interval group and to obtain the right number of parking space needs for Cilebut Station, find the group of parking intervals that have the most number of parking motorcycles. The selected and appropriate parking space needs figure is used to calculate the needs of parking space units (SRP) using a formula approach from the Technical Guidelines for Parking Implementation of the Department of Transportation. 1996.
3. Primary data, namely the number of vehicles in a day and the number of available parking spaces, and secondary data, namely the area of parking spaces at Cilebut Station, were calculated using the equation and the Directorate General of Land Transportation, 1996 produced problems and parking capacity.
4. Data processing with Microsoft Excel program.

RESULTS AND DISCUSSION

Vehicle Recording When Entering and Exiting

Volume

Parking volume is the number of vehicles that are parked at the study site over some time, in which case the calculation is grouped every 15 minutes. By knowing the volume of parking vehicles from a parking facility, it can be determined the amount of parking space needed to accommodate the volume of parking vehicles that occur. The greater the volume of vehicles, the need for parking space will also increase. Furthermore, data analysis of survey results was carried out to obtain the volume of parking at the study site for 12 hours of observation as shown in Table 1 below.

Table 1. Motorcycle Parking Volume

No	Day/Date	Time	Number of Vehicles
1	Monday, September 19, 2022	06:00 - 18:00	209
2	Tuesday, September 20, 2022	06:00 - 18:00	207
3	Wednesday, September 21, 2022	06:00 - 18:00	213
4	Thursday, September 22, 2022	06:00 - 18:00	207
5	Monday, September 26, 2022	06:00 - 18:00	209
6	Tuesday, September 27, 2022	06:00 - 18:00	209
7	Wednesday, September 28, 2022	06:00 - 18:00	213
8	Thursday, September 29, 2022	06:00 - 18:00	209
9	Monday, October 03, 2022	06:00 - 18:00	205
10	Tuesday, October 04, 2022	06:00 - 18:00	210
11	Wednesday, October 05, 2022	06:00 - 18:00	216
12	Thursday, October 06, 2022	06:00 - 18:00	205
13	Monday, October 10, 2022	06:00 - 18:00	210
14	Tuesday, October 11, 2022	06:00 - 18:00	211
15	Wednesday, October 12, 2022	06:00 - 18:00	204
16	Thursday, October 13, 2022	06:00 - 18:00	218

Based on Table 1 above, the maximum volume of motorcycle parking occurred on Thursday with a total of 218 vehicles.

Incoming and Vehicle Data Matching

Accumulated Parking

Accumulation of parking is the number of vehicles that park in an area at a certain time. The peak parking time and the number of parking vehicles can be obtained from the results of parking accumulation. The data obtained for sixteen days recorded the number of vehicles entering and

exiting and then grouped in 15-minute time intervals so that the percentage of vehicle distribution in and out and the accumulated parking figures were obtained. Based on the Table of Accumulated Parking and The Number of Passengers Coming in and out of Motorcycles at the Station in Cilebut it can be seen the magnitude of the distribution of the number of vehicles available for each 15-minute interval of the survey, can be seen in Table 2 as follows.

Table 2. Accumulated Parking

No	Day/Date	Maximum Accumulation (Vehicle)	Peak Hours (WIB)
1	Monday, September 19, 2022	175	15:00 - 15:14
2	Tuesday, September 20, 2022	175	15:00 - 15:14
3	Wednesday, September 21, 2022	174	16:00 - 16:14
4	Thursday, September 22, 2022	171	14:45 - 14:59
5	Monday, September 26, 2022	181	15:45 - 15:59
6	Tuesday, September 27, 2022	199	11:30 - 11:44
7	Wednesday, September 28, 2022	174	16:00 - 16:14
8	Thursday, September 29, 2022	176	15:00 - 15:14
9	Monday, October 03, 2022	190	11:45 - 11:59
10	Tuesday, October 04, 2022	186	12:00 - 12:14
11	Wednesday, October 05, 2022	182	15:45 - 15:59
12	Thursday, October 06, 2022	174	15:00 - 15:14
13	Monday, October 10, 2022	175	14:45 - 14:59
14	Tuesday, October 11, 2022	170	15:00 - 15:14
15	Wednesday, October 12, 2022	172	15:45 - 15:59
16	Thursday, October 13, 2022	171	15:00 - 15:14

Parking duration

Parking duration is the period of a vehicle parking somewhere (in units of hours). Based on the results of the study above, it was obtained that the average parking duration with a time interval of 0.25 hours, can be seen in Table 3 as follows.

Table 3. Parking Duration

No	Day/Date	Observation Time (UTC)	Maximum Duration (Clock)	Minimum Duration (Clock)	Average duration (Clock)
1	Monday, September 19, 2022	06:00 - 18:00	11:43	02:13	07:35
2	Tuesday, September 20, 2022	06:00 - 18:00	11:27	02:18	07:36
3	Wednesday, September 21, 2022	06:00 - 18:00	11:50	02:03	07:24
4	Thursday, September 22, 2022	06:00 - 18:00	11:39	02:11	07:33
5	Monday, September 26, 2022	06:00 - 18:00	11:34	02:47	07:27
6	Tuesday, September 27, 2022	06:00 - 18:00	10:36	01:06	07:05
7	Wednesday, September 28, 2022	06:00 - 18:00	11:53	01:56	07:45
8	Thursday, 29 September 2022	06:00 - 18:00	11:46	02:02	07:29
9	Monday, October 03, 2022	06:00 - 18:00	10:58	01:06	07:01
10	Tuesday, October 04, 2022	06:00 - 18:00	11:24	01:01	07:51

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No	Day/Date	Observation Time (UTC)	Maximum Duration (Clock)	Minimum Duration (Clock)	Average duration (Clock)
11	Wednesday, October 05, 2022	06:00 - 18:00	10:52	02:04	07:18
12	Thursday, October 06, 2022	06:00 - 18:00	11:05	02:21	07:25
13	Monday, October 10, 2022	06:00 - 18:00	11:07	02:21	07:23
14	Tuesday, October 11, 2022	06:00 - 18:00	10:57	01:40	07:06
15	Wednesday, October 12, 2022	06:00 - 18:00	11:42	02:11	07:38
16	Thursday, October 13, 2022	06:00 - 18:00	10:41	01:51	07:05
			Max	11:53	
			Average	07:25	
			Min	01:01	

From Table 3 above, the maximum duration of the largest occurred on Wednesday, September 28, 2022, at 11:53 hours. The maximum average duration occurred on Thursday 06 October 2022 at 07:25 hours, and the minimum duration occurred on Tuesday 04 October 2022.

Turn Over Parking Change

Parking turnover shows the amount of use of one parking space obtained from the comparison between the number of vehicles parked and the number of available parking capacity spaces. By knowing the value of parking changes, you can find out the level of use of parking spaces as shown in Table 4 below.

Table 4. Turn Over Parking

No	Day/Date	Parking Capacity (SRP)	Parking Volume (Vehicle)	Turn Over Parking
1	Monday, 19 September 2022	120	209	174.17
2	Tuesday, 20 September 2022	120	207	172.50
3	Wednesday, 21 September 2022	120	213	177.50
4	Thursday, 22 September 2022	120	207	172.50
5	Monday, September 26, 2022	120	209	174.17
6	Tuesday, September 27, 2022	120	209	174.17
7	Wednesday, 28 September 2022	120	213	177.50
8	Thursday, 29 September 2022	120	209	174.17
9	Monday, October 03, 2022	120	205	170.83
10	Tuesday, October 04, 2022	120	210	175.00
11	Wednesday, October 05, 2022	120	216	180.00
12	Thursday, October 06, 2022	120	205	170.83
13	Monday, October 10, 2022	120	210	175.00
14	Tuesday, October 11, 2022	120	211	175.83
15	Wednesday, October 12, 2022	120	204	170.00
16	Thursday, October 13, 2022	120	218	181.67
			Max	181.67

No	Day/Date	Parking Capacity (SRP)	Parking Volume (Vehicle)	Turn Over Parking
			Average	175.15
			Min	170.00

From Table 4 above, it can be seen that the highest value of motorcycle parking turnover is 181.67%, the average value is 175.15%, and the minimum value is 170%. This shows that the performance of motorcycle parking is quite high by exceeding 100% lift.

Parking Index

Parking performance can also be seen based on parking index figures. The parking index is the percentage of the number of parking vehicles occupying a parking area with the number of available parking spaces in that parking area. The value of the index of motorcycle parking at Cilebut stations based on the maximum parking accumulation is obtained using the formula. The parking index after going through the calculation stage is in Table 5 as follows.

Table 5. Parking Index

No	Day/Date	Parking Capacity (SRP)	Accumulated Parking (Maximum)	Parking Index (%)
1	Monday, September 19, 2022	120	175	145.83
2	Tuesday, September 20, 2022	120	175	145.83
3	Wednesday, September 21, 2022	120	174	145.00
4	Thursday, September 22, 2022	120	171	142.50
5	Monday, September 26, 2022	120	181	150.83
6	Tuesday, September 27, 2022	120	199	165.83
7	Wednesday, September 28, 2022	120	174	145.00
8	Thursday, September 29, 2022	120	176	146.67
9	Monday, October 03, 2022	120	190	158.33
10	Tuesday, October 04, 2022	120	186	155.00
11	Wednesday, October 05, 2022	120	182	151.67
12	Thursday, October 06, 2022	120	174	145.00
13	Monday, October 10, 2022	120	175	145.83
14	Tuesday, October 11, 2022	120	170	141.67
15	Wednesday, October 12, 2022	120	172	143.33
16	Thursday, October 13, 2022	120	171	142.50
			Max	165.83
			Average	148.18
			Min	141.67

From Table 5 above, the motorcycle parking index that occurs at the maximum value is 153.08%, the average value is 136.78%, and the minimum value is 130.77% (based on maximum accumulation). From the parking index value obtained, it is stated that the demand for parking space is greater than the parking capacity because it has an index value of more than 100%.

Parking Space Needs Analysis
Parking Space Needs

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From the results of calculations with this formula, a recapitulation of the need for parking space (Z) at Cilebut Station is obtained as shown in Table 6 as follows.

Table 6. Parking Space Needs

No	Day/Date	Survey Length (Clock)	Parking Volume (Vehicle)	Average duration (Clock)	Parking Space Needs
1	Monday, September 19, 2022	12	209	07:35	158.49
2	Tuesday, September 20, 2022	12	207	07:36	131.10
3	Wednesday, September 21, 2022	12	213	07:24	131.35
4	Thursday, September 22, 2022	12	207	07:33	130.24
5	Monday, September 26, 2022	12	209	07:27	129.75
6	Tuesday, September 27, 2022	12	209	07:05	123.37
7	Wednesday, September 28, 2022	12	213	07:45	137.56
8	Thursday, September 29, 2022	12	209	07:29	130.33
9	Monday, October 03, 2022	12	205	07:01	119.87
10	Tuesday, October 04, 2022	12	210	07:51	137.38
11	Wednesday, October 05, 2022	12	216	07:18	131.40
12	Thursday, October 06, 2022	12	205	07:25	126.70
13	Monday, October 10, 2022	12	210	07:23	129.21
14	Tuesday, October 11, 2022	12	211	07:06	124.84
15	Wednesday, October 12, 2022	12	204	07:38	129.77
16	Thursday, October 13, 2022	12	218	07:05	128.68
				Max	158.49
				Average	131.25
				Min	119.87

Table 6 above, shows that the most parking space needed for motorcycles at Cilebut Station occurred on Monday, September 19, 2022, amounting to 158.49 ~ 159 SRP.

Standard Parking Space Needs

Based on the data analysis carried out, the available parking capacity and the need for parking spaces can be known by analyzing the number of vehicles parked against the number of available parking spaces, if the need for parking spaces is greater than the available parking capacity, it means that the number of available parking spaces is insufficient. If the need for parking space is smaller than the available parking capacity, it means that the number of available parking spaces is still able to accommodate vehicles that will park in the parking area. The need for parking space based on the largest Z formula approach is determined as the value of parking space needs that must be met by the Cilebut Station. If the need for parking space is determined based on the results of research in the field, then the value of the parking space needs taken is at the time of maximum accumulation. The following is a comparison of parking spaces against the parking capacity of existing parking spaces (Department of Transportation. 1996).

Table 7. Parking Space capacity requirements

No	Day/Date	Parking Space Needs	Parking Space Capacity	Parking Space Needs Difference (+/-)
1	Monday, September 19, 2022	159	120	-39.00
2	Tuesday, September 20, 2022	132	120	-12.00
3	Wednesday, September 21, 2022	132	120	-12.00
4	Thursday, September 22, 2022	131	120	-11.00
5	Monday, September 26, 2022	130	120	-10.00
6	Tuesday, September 27, 2022	124	120	-4.00
7	Wednesday, September 28, 2022	138	120	-18.00
8	Thursday, September 29, 2022	131	120	-11.00
9	Monday, October 03, 2022	120	120	0.00
10	Tuesday, October 04, 2022	138	120	-18.00
11	Wednesday, October 05, 2022	132	120	-12.00
12	Thursday, October 06, 2022	127	120	-7.00
13	Monday, October 10, 2022	130	120	-10.00
14	Tuesday, October 11, 2022	125	120	-5.00
15	Wednesday, October 12, 2022	130	120	-10.00
16	Thursday, October 13, 2022	129	120	-9.00

Description: (+) = Parking Space Capacity still meets
(-) = Parking Space Capacity does not meet

Table 7 above shows the value of parking space requirements based on the formula approach (equation 7) greater than the static capacity. If the value of parking space needs is determined based on the maximum accumulation that occurs (the results of field surveys), then the need for parking spaces to static capacity requires additional space for the parking area.

CONCLUSION

Based on the results of the survey and data analysis obtained, namely the existing condition of the parking lot, it obtained secondary data using the survey method to produce existing data on the area of 486m^2 motorcycle parking area with a capacity of 120 SRP at the Cilebut station. In this analytical study, the largest accumulated stasis capacity was 159 vehicles with an average parking duration of 11:53 hours on the peak day, namely Wednesday, September 28, 2022. During the sixteen days of the survey conducted it was known that the maximum parking volume of 218 vehicles with a maximum accumulated vehicle parking of 171 vehicles occurred on Thursday 13 October 2022, the turnover of motorcycle parking at the highest Cilebut station reached 181.67% this shows that the performance of motorcycle parking is quite high. The capacity of the motorcycle parking space at the Cilebut station cannot meet the existing parking needs. This is shown by seeing the parking index exceeding the 100% mark.

REFERENCE

Amuji Ade. 2019. Parking Management as an Effort to Increase Regional Native Income, (Case Study: Banda Aceh City Transportation Agency). Thesis

Dimas Rizky Amanullah. 2020. Capacity Analysis of Off-Street Parking Spaces in Shopping Centers During the Covid-19 Pandemic (Case Study: Yogya Department Store, Tegal City)

Mis'al Abdillah. 2019. Evaluation of Parking Services on Suryakencana Main Road Section (Case Study of Parking Lots in Suryakencana Bogor), Composite Journal: Journal of Civil Engineering Sciences, Vol.06, No.02.

Ro'yu Awwalul Mu'minul Quddus Salam. 2020. Planning Study of Motorcycle Parking Building in the Area of the Faculty of Engineering and Science, Ibn Khaldun University Bogor, Composite Journal: Journal of Civil Engineering Sciences Vol.4, No.1.

PT.Kereta Api Indonesia (Persero) Unit Arsitektur dan Pelayanan, 2017. Jakarta.

Badan Informasi Geospasial. 2022. MAP Source. Bogor.

Department of Transportation. 1996. Directorate General of Land Transportation, No. 272/HK.105 1996. Department of Transportation (Issue 8, Pp. 1–15).

Cicilia Fransisca Ganda, Hary Moetriono, Sri Wiwoho Mudjanarko. 2019. Analisis Alternatif Pembiayaan Penyeberangan Asdp Ujung-Kamal Akibat Dibangunnya Jembatan Surabaya-Madura. ASTONJADRO, 8(2), 103-109. http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO/article/view/2801/1681

Hana Karimah, Juang Akbardin. 2019. Kajian Tentang Model Bangkitan Pergerakan Permukiman Kawasan Ciwastra Kota Bandung, ASTONJADRO, 8(2), 97-102. http://ejournal.uika-bogor.ac.id/index.php/ASTONJADRO/article/view/2799.

Syaiful Syaiful, Hermanto Siregar, Ernan Rustiadi, Eri Susanto Hariyadi. 2022. Performance Of Three Arms Signalized Intersection at Salabenda in Bogor Regency, ASTONJADRO, 11(1), 13-29.

S Syaiful, H Siregar, E Rustiadi, ES Hariyadi. 2022. Model Rekayasa Lalu lintas dalam Sistem Transportasi dengan Pola Kerjasama antar Wilayah Berkelanjutan di Kota Bogor. IPB University.

S Syaiful, H Rusfana. 2022. Rigid Pavement Planning in Traffic: Case Study in Ciherang Road and Pemuda Road, Bogor Regency, Indonesia. Journal of Applied Engineering Science, 1-13.

S Syaiful, Y Pratama. 2019. Sustainable Studies about General Public Transport Performance in the City of Bogor, ARPN Journal of Engineering and Applied Sciences 14 (18), 3241-3247.

S Syaiful, D Hariyadi. 2019. Case Study on Sustainable T-Jungtion Cibinong City Mall (CCM) in Bogor Indonesia, ARPN Journal of Engineering and Applied Sciences 14 (17), 2960-2971.

S Syaiful, H Prayoga, J Akbardin. 2020. Sustainable about the Need of Parking Systems at the Mall RDS Bogor, ARPN Journal of Engineering and Applied Sciences 15 (22), 2620-2626.

S Syaiful, A Fadly. 2020. Analysis of the Effectiveness of Bus Services Outside of Campus IPB Dramaga Bogor. ASTONJADRO, 9 (2), 173-186.

S Syaiful, H Siregar, E Rustiadi, ES Hariyadi. 2021. Traffic Improvement Strategy in Transportation System Using AHP Method. ARPN Journal of Engineering and Applied Sciences 16 (22), 2431-2439.

Syaiful Syaiful, Renea Shinta Aminda, Yuggo Afrianto, 2023. Influence motorcycle density on noise sound at the highway. ASTONJADRO, 12 (1), 304-313.

S Syaiful, P Pratikso, SW Mudjanarko, 2023. Literature Study of the Sustainability Model of Transportation Facilities and Infrastructure in the Management of Public Transportation with the Concept of Inter-Regional Cooperation (Case in the City and District of Bogor). ASTONJADRO 12 (2), 613-634.

Syaiful Syaiful, Muhamad Yulianto, Tedy Murtejo, Rulhendri Rulhendri. 2023. Analysis of the Function and Convenience of Pedestrian Public Transport Support the City of Bogor. ASTONJADRO 12 (3), 646-657.

Syaiful Syaiful, Anggi Muskita Zein, Rulhendri Rulhendri, Renea Shinta Aminda. 2023. Parking Analysis on Bogor Agricultural University Campus. ASTONJADRO 12 (3), 919-933.

Faris Azmi Pratama, Syaiful Syaiful, Renea Shinta Aminda. 2023. Paid Parking Performance Analysis at Depok Lama Station. ASTONJADRO 12 (3), 934-952.