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EVALUATION OF THE NEED FOR MOTORCYCLE AND CAR PARKING SPACES

Sebastianus Priambodo, Mohammad Djaelani, Jahroni, Didit Darmawan, Ella Anastasya Sinambela

University of Sunan Giri, Surabaya

correspondence: easinambela@gmail.com

Abstract-*The urgency of the need for parking spaces becomes a priority when the available land is not sufficient to accommodate vehicles entering the parking area. In addition to evaluating the need for parking spaces, evaluation of the level of security, behavior, and parking facilities is also important. This evaluation is expected to provide an alternative solution to the problem of parking in the Sunan Giri University campus area, Surabaya. This research was conducted through three stages. The first stage of the research is in the form of measuring parking spaces (both cars and motorbikes) in the area of Sunan Giri University, Surabaya. The second stage of research is an evaluation of the characteristics of vehicles entering the campus parking area. The second phase of the research was conducted on Mondays and Fridays. In this stage, the duration of each type of vehicle that uses the parking lot is calculated. Furthermore, data on the parking area and the number of vehicles using the campus parking lot are used to evaluate the need for parking spaces. The third stage of research is in the form of distributing questionnaires that aims to evaluate security issues, behavior, and parking facilities. Based on the research, it can be concluded that the parking area at Sunan Giri University Surabaya is quite good. Students and employees can access parking easily. In addition, the facilities and parking services obtained have been felt to be quite good.*

Keywords: parking volume, parking capacity, Parking Space Requirement (PSR).

INTRODUCTION

The success of a country can be seen from the existing educational factors. A good education system and support from infrastructure will improve the quality of education. Not only about learning materials, but also the means to support the learning system. Higher education institutions as implementers of educational activities need to provide adequate infrastructure. One of them is the parking area.

According to Hobbs (1995), parking is defined as an activity to place or store vehicles in a certain place, the duration of which depends on the completion of the needs of the driver. According to Warpani (1990), the definition of parking is putting a vehicle from a place or area for a certain parking period (duration). Traffic goes to a place and after reaching that place, a parking space is needed. Lack of providing adequate parking facilities in accordance with the expected and permitted demand can cause congestion. With the increase in travel rates, the need for parking spaces will also increase. This does not rule out the need for additional land used for parking. In addition, the increase in vehicle ownership will lead to an increase in parking capacity (Fabusuyi & Hampshire, 2018).

The parking space unit is a measure of the space requirement for parking a vehicle safely and comfortably with the most efficient use of space (Munawar, 2005). The parking space unit size is the core size of the space required to park a vehicle (Chaniotakis & Pel, 2015). In order to obtain uniformity in determining the amount of capacity of parking facilities, it is necessary to determine Parking Space Units that can be used in the parking design: 1) Standard Vehicles; 2) Free Vehicle Parking Space; 3) Vehicle Door Opening Width.

The discussed aspects of parking control are with a commercial orientation, while the objectives of parking control itself are (Directorate General of Land Transportation, 1998): 1. Prevent the occurrence of obstacles to the flow of vehicles; 2. Reduce accidents; 3. Make more effective use of parking spaces; 4. Preserving historical objects, if they are in a city with high historical value; Act as a barrier mechanism against road use in congested areas.

Currently parking control is the only method to limit vehicle movement that can be carried out by a comprehensive and integrated transportation system planner (Djaelani & Darmawan, 2021). Parking controls are implemented primarily to reduce vehicle barriers and to enable roads to better meet traffic demand, by changing on-street parking to off-street parking (Shoup, 2006).

In regulating parking, according to Hobbs (1995) it is not only technical interests that are a concern, but also concerns about beauty issues. In general, it can be said that parking control or management is needed to prevent or eliminate traffic barriers, reduce accidents, create conditions so that parking spaces are used effectively and efficiently, maintain the beauty of the environment and create mechanisms for effective and efficient use of roads, especially on roads where there are traffic jams. traffic.

To create a learning and work environment in universities, Sunan Giri University should pay attention to parking management. For employees and lecturers, as an element of the work environment, this will provide security for their vehicles (Lestari, 2020; Retnowati, 2021; Sinambela, 2021). So do the students.

In planning a comfortable parking space, it is necessary to know the need for parking spaces. Parking space requirements are determined based on the Parking Space Unit (PSU). There are various considerations taken to determine the Parking Space Unit (PSU). The determination of the Parking Space Unit (PSU) is divided into three types of vehicles and based on the determination of the PSU for passenger cars it is classified into three groups, as shown in Table 1.

Table 1
The determination of the Parking Space Unit

No	Transportation type	Parking Space Unit (m^2)
1	a. Passenger Cars for Groups I	2.30 x 5.00
	b. Passenger Cars for Groups II	2.50 x 5.00
	c. Passenger Cars for Groups III	3.00 x 5.00
2	Bus / truck	3.40 x 12.50
3	Motorcycle	0.75 x 2.00

Parking demand is strongly influenced by the land use pattern of the area, so that parking arrangements are closely related to land use patterns that are adjusted to the Detailed City Spatial Plan. The large demand for parking triggers the act of parking vehicles on the road, it is hoped that there will be a minimum parking facility provision at existing activity centers and new activity centers as a condition for IMB. The Directorate General of Land Transportation issues a standard for forecasting parking needs in various areas.

Parking is not a new phenomenon. Parking is a problem that is often encountered in the transportation system (Kobus et al., 2013). Parking problems occur in big cities and developing cities. Parking problems can affect the movement of vehicles, where vehicles that pass through places that have high activity rate of movement will be hampered by vehicles parked on the road. This causes congestion on the road. In an effort to deal with this problem, it is necessary to provide sufficient parking space and determine the appropriate form of parking modeling on the existing parking lot, where the need for parking space (demand) and the required infrastructure (supply) must be balanced and adapted to the characteristics of the parking lot.

Parking problems can occur in various places, including on campus areas. The high number of students using vehicles creates its own problems in managing and providing parking spaces in the campus area. This results in further impacts that may occur, such as student discomfort when parking vehicles, parking vehicles outside the parking area, and so on. Sunan Giri University is one of the universities in Surabaya. Based on the area owned, Sunan Giri University has an adequate parking area. This study aims to evaluate the need for motorcycle and car parking spaces at Sunan Giri University, Surabaya.

RESEARCH METHODS

This research is a literature study and a descriptive study because it describes the characteristics or phenomena being studied (Mardikaningsih, 2013; Darmawan, 2015). The research was conducted at Sunan Giri University, Surabaya. The research was conducted through surveys and interviews on Mondays and Fridays. Monday was chosen because it is estimated that there will be more parking users. Meanwhile, on Friday there are fewer parking users.

The data needed in this study is primary data, namely data directly obtained from the field through a direct survey of incoming and outgoing vehicles at the research site. From the results of the measurement of the parking area in the field, the results obtained in the form of parking space capacity and parking configurations. Existing data were analyzed using the computer program Ms. Excel 2019 with the following stages: 1. Parking accumulation is calculated based on 15-minute intervals. Within 15 minutes the number of vehicles entering and leaving is counted; 2. Vehicle parking volume is obtained by adding up the incoming vehicles in one day; 3. From the analysis above, it can be determined turnover, parking space requirements, parking index, and parking duration. In addition, this study also examines the parking facilities provided by the university.

RESULTS AND DISCUSSIONS

Sunan Giri University has several parking areas that can be used by students, lecturers, and university employees. This study uses the entire parking area. The study was conducted on Mondays and Fridays. The research was conducted at 08.00-16.00. Parking volume at Sunan Giri University Surabaya on Monday is obtained based on calculations.

Volume = vehicles entering the parking lot + existing vehicles

Table 2.
Motorcycle and Car Parking Volume

Transportation type	Day	Volume (Transportation)
Motorcycle	Monday	129
	Friday	73
Car	Monday	17
	Friday	8

The results of observations in this study indicate that the largest volume entering the parking area of Sunan Giri University Surabaya, for motorcycles occurred on Monday, namely 129 vehicles. The difference in the volume of motorcycles that entered on Monday and Friday decreased by 56 vehicles. Furthermore, the largest volume of car vehicles occurred on Monday, which was 17 vehicles. The difference in the volume of incoming cars on Monday and Friday decreased by 9 vehicles. Parking Space Capacity is the capacity of a vehicle at the parking location. Parking Space Capacity can be calculated by the formula:

$$\text{Parking Space Capacity} = \frac{\text{Parking Area}}{\text{Parking Space Unit}}.$$

Based on the calculations, it is known that the parking space capacity at Sunan Giri University Surabaya is 187 for motorcycle parking. For Car Parking, there is a parking space capacity of 40 cars. The configuration of the motorcycle parking area at Sunan Giri University Surabaya uses a parallel and angular parking pattern with an angle of 90°. While the configuration of the car parking area uses an angled parking with an angle of 90° and a 45°.

Table 3.
Motorcycle and Car Parking Volume

Transportation type	Day	Turnover (drive/day/room)
Motorcycle	Monday	0,68
	Friday	0,39
Car	Monday	0,425
	Friday	0,2

The turnover rate obtained from the calculation results shows that the use of parking spaces, the maximum motorcycle turnover rate occurs on Monday at 0.68 drives/day/room and the maximum car turnover occurs on Monday at 0.425 drives/day/room. Parking index is the percentage of vehicles that use the parking lot with the number of parking areas available in a certain period of time. In a study conducted at the parking area of Sunan Giri University, Surabaya, parking calculations used 15 minute intervals.

Table 4.
Motorcycle and Car Parking Index

Day	Motorcycle parking index (%)		Car park index (%)	
	Average	Max	Average	Max
Monday	68	85	42	45
Friday	39	56	20	17

Furthermore, it is known that the parking duration at Sunan Giri University Surabaya is in the range of 3-6 hours for motorbikes. Furthermore, the parking duration for cars is known to have a parking duration in the range of 2-6 hours.

Based on the results of the study, it is known that the parking area at Sunan Giri University is adequate. For full activities on Monday, the volume of parked vehicles fills 85% of the area for motorbikes and 42.5% for cars.

The discussion of parking facilities and places is presented in Table 10 as follows: (1) A total of 39 respondents (97.5%) answered that the service of parking attendants was good and friendly, and 1 respondent (2.5%) answered no. (2) A total of 35 respondents m (87.5%) stated that the existing parking system was not difficult, and 5 respondents (12.5%) answered that it was difficult. (3) A total of 19 respondents (47.5%) found it easy to find a parking space, and 21 respondents (52.5%) found it difficult to find a parking space. (4) A total of 24 respondents (60%) think that the class schedule affects the ease of getting a parking space, namely sessions 2 and 3 every active day of class (except Friday session 2). A total of 16 respondents (40%) thought that the class schedule did not affect the ease of getting a parking space.

A good parking management system is needed to manage parking to manage vehicle capacity and security (Hill et al., 2005; Padma, 2018). This is because it still uses a manual parking system. Parking management strategy is the determination of the stages or taking steps that must be taken such as planning, executing, organizing, controlling, and supervising parking to achieve the desired goals (Khasanah, 2010; Mahyanaila, 2016; Fabusuyi & Hampshire, 2018). A quality control system is also needed in this management (Gunawan, 2012; Mardikaningsih & Darmawan, 2020). This is an effort to improve the quality of service for parking users.

CONCLUSIONS

Based on the research, it can be concluded that the parking area at Sunan Giri University Surabaya is quite good. Students and employees can access parking easily. In addition, the facilities and parking services obtained have been felt to be quite good. In future research, it is expected to design a parking lot for motorbikes and cars at Sunan Giri University, Surabaya. It is recommended that the Sunan Giri University Surabaya rearrange the exit and entry routes for parking vehicles by making vehicle guard posts at the exit and entrance of the campus, in order to regulate traffic flow and reduce traffic barriers that can reduce the convenience of parking lot users. For the infrastructure planning department of Sunan Giri University Surabaya, it can increase the need for parking spaces to anticipate parking surges and improve parking facilities in order to provide comfort and a sense of security for visitors to Sunan Giri University Surabaya. It is also recommended that safe parking will manage all vehicle parking transactions with a computer system and it will be easy to control data, especially data related to parked vehicles.

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