Analysis of Padang Panjang City Center Market Parking Space

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Abstract: *The Padang Panjang City Center Market is one of the centers of economic activity with a high level of visits, thus causing the problem of limited parking spaces, which leads to the accumulation of vehicles and illegal parking. This study analyzes parking characteristics in the market area, including accumulation, duration, volume, turnover rate, parking index, and parking space needs by referring to the 1996 Technical Guidelines for the Implementation of Parking Facilities. The study results showed that the highest accumulation of motorcycles occurred on Friday at 08.30–09.00, with as many as 180 vehicles, while the highest accumulation of cars was recorded at 10.00-10.30, with as many as 105 vehicles. The average duration of parking a motorcycle is 1.38 hours/vehicle, and a car is 1.43 hours/vehicle. The highest parking volume of motorcycles reached 841 vehicles, and cars reached 291 vehicles. The highest parking turnover rate for motorcycles is 6.46 vehicles/plot, and 4.15 vehicles/plot for cars. The highest parking index is 1.38 vehicles/plot for motorcycles and 1.50 vehicles/plot for cars. The parking space needed is 166 PSU for motorcycles and 60 PSU for vehicles. Based on these results, it can be concluded that the parking capacity at the Padang Panjang City Center Market is insufficient, especially for motorcycles. Therefore, it is necessary to increase capacity and rearrange parking spaces so that their use is more optimal and can support the smooth running of market activities.*

INTRODUCTION

Padang Panjang City is one of the smallest cities in West Sumatra Province, with an area of about ± 2,300 hectares and consists of two sub-districts, namely West Padang Panjang and East Padang Panjang, which are geographically located at an altitude between 650 and 850 meters above sea level, so that it has a cool climate and relatively high rainfall. According to the Central Statistics Agency of Padang Panjang City (2025), the population of Padang Panjang City is around 60,264 people, and it has an area of 23 km2.

In addition to its regional characteristics, Padang Panjang City has a strategic position as a

center of local economic activity with various public facilities and a growing trade sector. One of the main economic activity centers is the Padang Panjang Central Market, which was built in 2016-2017 and reinaugurated in 2018. The central market of Padang Panjang consists of three floors, each used for certain types of goods, such as necessities, clothing, and household items.

The Padang Panjang City Center Market is a major trading center that not only serves the local community but also attracts traders and visitors from surrounding areas such as Batipuh, Pitalah, Batusangkar, Payakumbuh, Kayu Tanam, and Sicincin. The high mobility flow increases the volume of vehicles entering the market area, causing limited parking spaces, vehicle accumulation, and illegal parking that interferes with smooth traffic. An initial survey on Friday, June 20, 2025, recorded as many as 70 units of cars and 300 units of motorcycles entering the market area during peak hours.

Using on-street parking and motorcycle taxi bases that narrow the traffic space exacerbates the parking problem. Based on data from the Transportation Agency, the Number of vehicles in Padang Panjang City has increased from 173,884 units in 2023 to 187,523 units in 2024, adding pressure to the availability of parking spaces in the market area.

Limited parking is also caused by the unclear parking line in the four-wheeled area, which makes vehicles park irregularly and not optimally. This condition narrows parking spaces, triggers vehicle buildup, and disrupts market entry and exit routes. Based on these conditions, an analysis of parking spaces in the Padang Panjang City Center Market is needed to determine the existing capacity, identify problems, and formulate management recommendations. This is an effort to support smooth mobility and traffic order in the market area.

THEORETICAL FRAMEWORK

Parking

In Law Number 22 of 2009 concerning Road Traffic and Transportation, it is stated that parking is a condition when the vehicle stops or does not move for a specific period of time and is abandoned by the driver, so it requires the arrangement of a special space so as not to cause traffic disruption. Meanwhile, according to the Directorate General of Land Transportation (1996), parking is a condition when the vehicle is stationary and not used for a specific period.

According to Inci (2015), parking is a stationary position of vehicles for a specific period, whether there are signs or not. When studied from a functional perspective, parking is described as a condition of vehicles that stop more than just dropping off or picking up passengers. Meanwhile, Parmar (2020) emphasized that parking includes cars abandoned by their drivers in certain places, with or without traffic signs. Thus, parking requires regular space use to avoid disturbing traffic flow.

Parking problems generally arise when the Number of vehicles is not proportional to the capacity of the land. Limited parking spaces often cause illegal parking, interfering with traffic (Manville, 2005). The importance of parking management in commercial areas and traditional markets is directly related to the mobility of the people (Lei, 2017). Therefore, the analysis of parking space is essential to ensure comfort, smoothness, and optimization of market functions, including in the Padang Panjang City Center Market.

Parking Sharing

Parking is one of the essential aspects of the urban transportation system that plays a direct role in the smooth flow of traffic and the use of urban space. In transportation studies, parking can be classified into several categories to understand its characteristics and management comprehensively. The classification is based on type, status, and purpose (Faheem, 2013).

According to the placement, the type of parking placement is differentiated, namely parking

on the road body (On Street Parking) and parking outside the road body (Off Street Parking) (Lin, 2017; Oktavianus, 2022).

Based on land ownership status, parking facilities can be categorized into public parking, special parking, and emergency parking (Cai et al., 2018; Hamre, 2014). Public parking refers to facilities owned and managed by the local government, such as on-street parking areas. Special parking refers to facilities located on private or business-owned land, managed by a third party under a government permit, such as parking buildings or commercial parking lots. Emergency parking, on the other hand, is temporary and established in response to specific events or situations that require additional parking spaces on either public or private land.

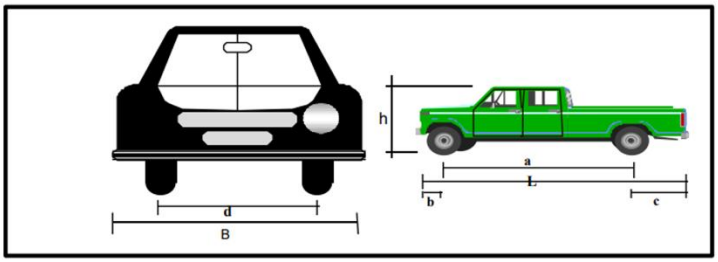
According to Calthrop (2000), parking can also be classified based on its purpose, namely passenger parking and goods parking, with the following explanation: Passenger parking is a short-term parking facility for boarding or dropping off passengers, and cargo parking is intended for logistics vehicles as a location for loading and unloading goods.

Parking Space Unit (PSU)

The Parking Space Unit (PSU) is an adequate size needed to accommodate one vehicle unit, whether passenger cars, buses, trucks, or motorcycles. The determination of PSU cannot be made arbitrarily, but various technical aspects must be considered to suit the needs and applicable standards (Klappenecker, 2014; Oyama et al., 2017).

Parking Space Unit (PSU) Considerations

Vehicle dimension for passenger car



a = axle distance
b = front hanging
c = back hanging
d = width
h = total height
B = total width
L = total length

Picture 1 Standard Vehicle Dimensions for Passenger Cars
(Source: Director General of Land Transportation, 1996)

Vehicle-free parking space

The parking vehicle free space is an additional area to facilitate the movement in and out of vehicles and prevent collisions. According to Abbeel (2008) and Cudak et al. (2017), lateral free space is set at least 5 cm, while longitudinal free space is at least 30 cm. This free space arrangement serves not only for safety, but also to ensure efficiency in planning parking facilities.

The width of the vehicle door opening is important in parking facility planning because it determines the comfort level and smooth movement of drivers and passengers when exiting or entering the vehicle. Therefore, the width of the door opening must be considered to ensure the comfort and safety of parking users (Oktavianus, 2022; Russell et al., 2019). The characteristics of vehicle users who use parking facilities can be divided into three categories, as shown in Table 1 below.

Table 1. Vehicle Door Opening

Types of Door Openings	Users and/or Parking Facility Designation	Goal
Front/rear door opens at the initial level of 55 cm	Employees/office workers Guest/visitor center of office activities, trade, government, and the University.	I
Front/rear door full open 75 cm	Visitors to sports venues, entertainment/leisure centers, hotels, trade centers, retail/supermarkets, hospitals, and cinemas.	II
Wheelchair Accessible and Wheelchair Accessible	People with disabilities.	III

(Source: Director General of Land Transportation, 1996)

There are three different classification categories for parking space units for passenger car-type vehicles, as shown in Table 2 (Sidik, 2019).

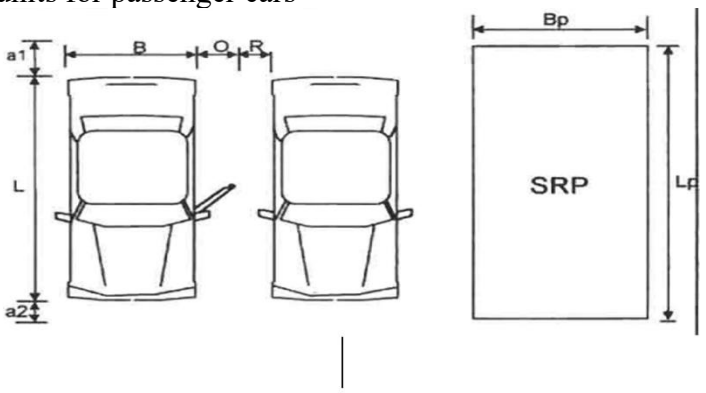
Table 2. Parking Vehicle Unit

	Vehicle Type	Parking Space Unit (m2)
1.	a. Passenger cars for class I	2.30 × 5.00
	b. Passenger cars for group II	2.50 × 5.00
	c. Passenger cars for group III	3.00 × 5.00
2.	Bus/truck	3.40 × 12.50
3.	Motorbike	0.75 × 2.00

(Source: Director General of Land Transportation, 1996)

The provisions for parking space units based on vehicle type can be seen as follows:

a. Parking space units for passenger cars



Information
B = total width of the vehicle
L = total length
R = Lateral Directional Free Movement
Lp = PSU Length
a1, a2 = clearance
O = longitudinal door opening width
Bp = PSU width

Picture 2. Passenger Car Parking Space Unit
(Source: Director General of Land Transportation, 1996)

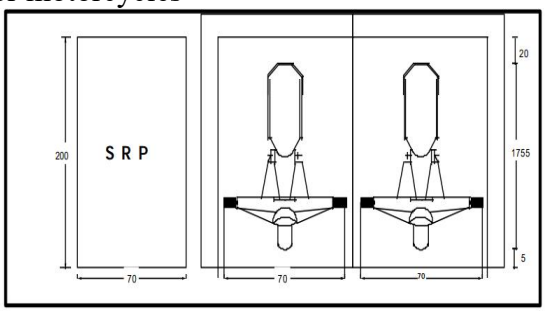
Table 3. Determination of Passenger Car PSU

Goal I	B = 170 cm	a1 = 10 cm	Bp = 230 cm = B + O + R
	O = 55 cm	L = 470 cm	Lp = 500 cm = L + a1 +a2
	R = 5 cm	a2 = 20 cm	
Goal II	B = 170 cm	a1 = 10 cm	Bp = 250 cm = B + O + R
	O = 75 cm	L = 470 cm	Lp = 500 cm = L + a1 +a2
	R = 5 cm	a2 = 20 cm	

Goal III	B = 170 cm	a1 = 10 cm	Bp = 300 cm = B + O + R
	O = 80 cm	L = 470 cm	Lp = 500 cm = L + a1 +a2
	R = 50 cm	a2 = 20 cm	

(Source: Director General of Land Transportation, 1996)

b. Parking space unit for motorcycles



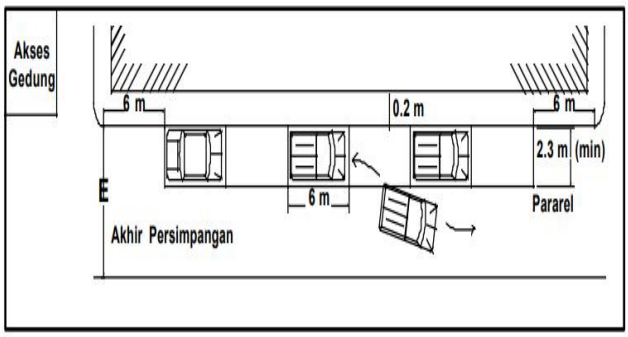
Picture 3. Motorcycle Parking Space Unit
(Source: Director General of Land Transportation, 1996)

Car Parking Pattern

According to Syarifuddin (2017), Car parking patterns are an important part of parking facility planning, as they determine land use efficiency, parking capacity, and smooth vehicle flow. The selection of parking patterns must consider land conditions and user needs to achieve space effectiveness. Car parking patterns are generally differentiated into parallel, angular, and perpendicular, each with different characteristics and implications for spatial planning and movement. There are several car parking patterns as follows:

Parallel Parking Pattern

A parallel parking pattern is a system of arranging vehicles parallel to the roadside or parking lot. This pattern is generally used on roads with limited width because it is more efficient in maintaining the smooth traffic flow. However, the capacity of vehicles that can be accommodated is relatively less than other patterns (Li, 2016).

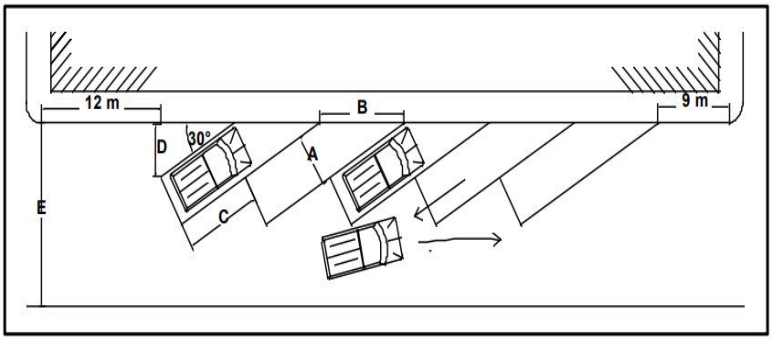


Picture 4. Parallel Parking Pattern
(Source: Director General of Land Transportation, 1996)

Corner Parallel Parking Pattern

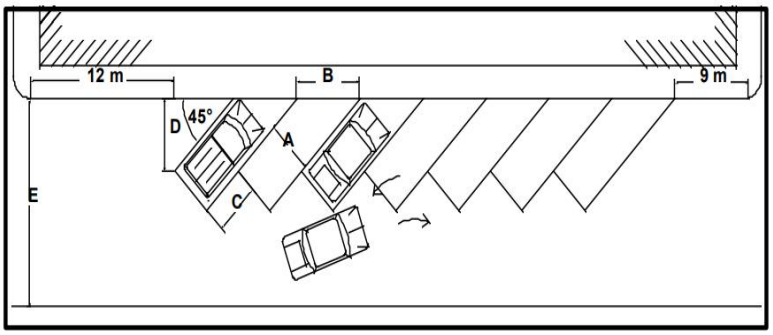
An angular parking pattern is a system of arranging vehicles inclined to the edge of the road or parking lot, usually at an angle of 30°, 45°, 60°, or 90 °. This pattern can increase vehicle capacity and facilitate entry, but requires a larger road width to keep vehicle maneuvers smooth. The pattern is seen in the image below:

a. Parking Pattern 30 ° angle



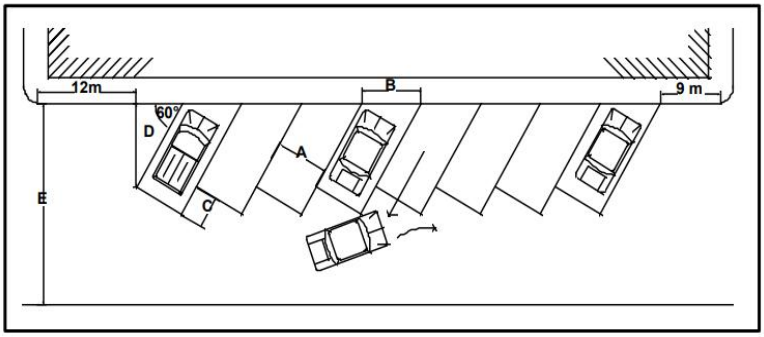
Picture 5. Parking Corner 30o
(Source: Director General of Land Transportation, 1996)

b. 45 ° Corner Parking Pattern



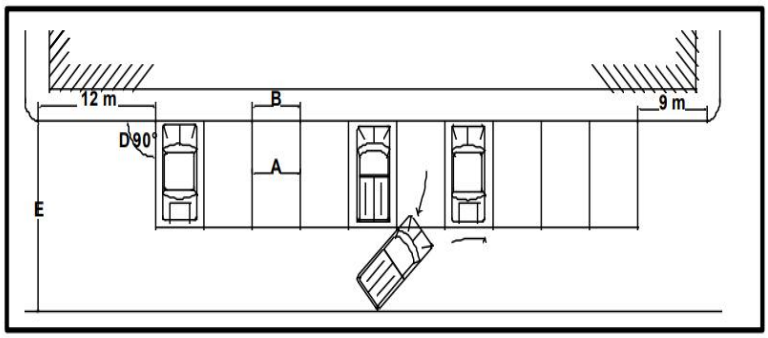
Picture 6. Parking Corner 45o
(Source: Director General of Land Transportation, 1996)

c. 60 Corner Parking Pattern



Picture 7. Parking Corner 60o
(Source: Director General of Land Transportation, 1996)

d. 90 Corner Parking Pattern

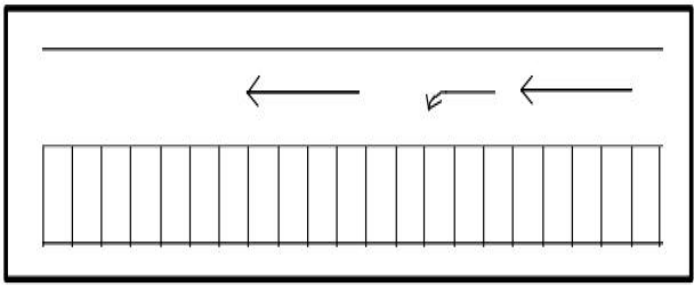


Picture 8. Parking Corner 90o
(Source: Director General of Land Transportation, 1996)

Motorcycle Parking Pattern

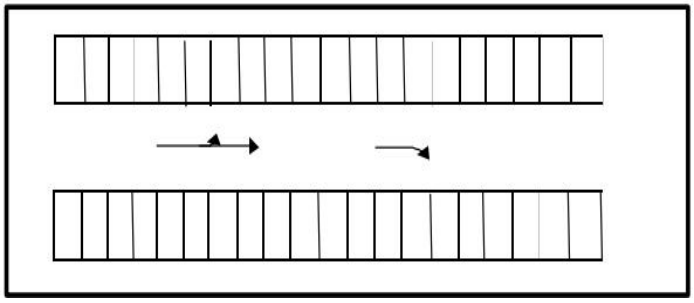
According to Octavian (2022), motorcycles are generally parked at a 90 ° angle. In terms of space use efficiency, this angle is considered the most optimal and provides advantages in the use of parking lots. This pattern is designed to maximize the parking capacity of motorcycles, which are dominant in urban areas, while paying attention to the ease of movement in and out of vehicles.

a. One-Sided Parking Pattern



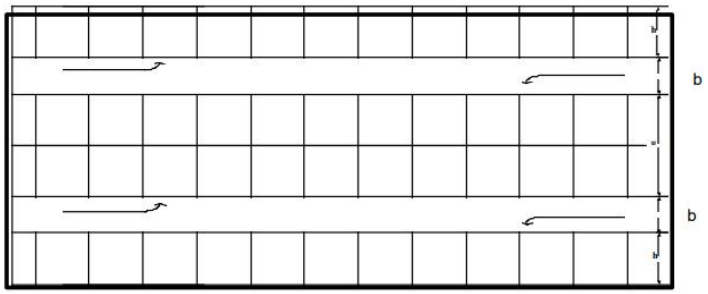
Picture 9. One-Sided Parking
(Source: Director General of Land Transportation, 1996)

b. Two-Sided Parking Pattern



Picture 10. Two-Sided Parking Pattern
(Source: Director General of Land Transportation, 1996)

c. Island Parking Patterns



Picture 11. Island Parking Patterns
(Source: Director General of Land Transportation, 1996)

Types of Parking Allowances

The need for parking areas at each location varies according to its function and designation. In general, these needs can be classified into two main categories based on their intended use, which are as follows; Fixed parking activities and temporary parking activities.

Parking Need Size

Various factors, including the type of parking service, tariff policy, land availability, motor vehicle ownership level, and socio-economic conditions of the community, determine the need for a parking area. Referring to the *Technical Guidelines for the Implementation of Parking Facilities* (Directorate General of Land Transportation, 1996), the standard of parking needs for various activities can be seen in Table 4.

Table 4. Size of Parking Space Requirements

Designation	Unit (PSU for passenger cars)	Parking Space Requirements
Trade center		
1. Shops	PSU/100 m2 effective floor area	3,5 – 7,5
2. Self-Service Market	PSU/100 m2 effective floor area	3,5 – 7,5
3. Market	PSU/100 m2 effective floor area	
Office Center		
1. Non-public service	PSU/100 m2 effective floor area	1,5 – 3,5
2. General services	PSU/100 m2 effective floor area	
School	PSU/student	0,7 – 1,0
Hotels/Places to Stay	PSU/room	0,2 – 1,0
Hospital	PSU/bed	0,2 – 1,3
Cinema	PSU/seat	0,1 – 0,4

(Source: Director General of Land Transportation, 1996)

Parking Characteristics

Parking characteristics are important studies in the parking system because they provide an overview of the parking lot use pattern and its utilization level (Parmar, 2020). According to Christiansen (2017), an understanding of parking characteristics is needed to maximize the performance of parking facilities. This information is an important foundation for planning and managing parking, especially in areas with high activity intensity, such as markets (Arnott, 2006). Here are some aspects of parking characteristics:

Parking Accumulation

One of the aspects commonly studied is parking accumulation, which is the Number of vehicles currently parked at a location in a certain period. This accumulation represents the

density and efficiency of parking lot use (Nourinejad, 2018; Sidik, 2019). Parking accumulation can be calculated using the formula:

Parking accumulation = Qin – Qout + QS..... (1)

Where:

QS = Number of existing vehicles

Qin = Number of vehicles entering

Qout = Number of vehicles exited

Parking Duration

In addition, there is an aspect of the average parking duration, which shows the time the vehicle has been in the parking facility. Based on this duration, parking can be classified into three categories, namely short-term parking (less than 1 hour, usually for trading purposes), medium-term parking (1-4 hours, generally for shopping), and long-term parking (more than 4 hours, usually for work) (Sidik, 2019). Equations that can be used to calculate the average length of parking are:

D = All - Tin ..... (2)

Where:

Tout = time of entry vehicle

Tin = time the vehicle exited

Parking Volume

Another aspect is parking volume, which is defined as the total Number of vehicles using the parking area in a given period, generally a whole day. This parking volume provides an overview of the intensity of use of parking facilities. The formula that can be used to calculate the parking volume is (Sidik, 2019):

Parking Volume =$_{Qs}$ + Qin ..... (3)

Where:

Vp = Parking Volume

Qin = Number of vehicles entering

Qs = Number of Existing Vehicles

Parking Turnover Rate

The parking turnover rate describes the frequency of parking space utilization by comparing the Number of vehicles parked during the observation period with the Number of available parking spaces. The high Rate of parking turnover shows the efficiency of space utilization. The formula that can be used to calculate parking changes is (Zahra, 2024):

Parking Turnover Rate = ... (4)$\frac{Qp}{Petak\ Parkir\ tersedia}$

Where:

TR = Parking turnover rate (vehicle/PSU/hour)

Qp = Number of vehicles parked per given period of time (vehicles)

Parking Index

Another indicator often used is the parking index, which is the ratio between the Number of vehicles currently parked and the available parking capacity. This index helps assess parking space adequacy in accommodating vehicles in a specific period (Caicedo, 2012). The formula for calculating the parking index is as follows:

Parking Index = ... (5)$\frac{Akumulasi\ Parkir}{Kapasitas\ Parkir}$

When the value of IP :

If the IP value > 1, the parking needs exceed the capacity/number of parking spaces.

The IP value is < 1, then the parking needs are below the capacity/Number of parking spaces.

The IP value = 1, then the parking needs are balanced with the capacity/number of vehicle plots.

Parking Requirements Standard

According to Cai et al. (2018), the parking needs standard is a standard measure used to determine the minimum amount of parking space that needs to be provided, considering the type of activity and the function of the building. This standard is generally calculated through certain equations that serve as a reference in planning appropriate parking capacity. Thus, implementing parking needs standards is an important basis in efforts to manage and plan parking spaces, including in commercial areas such as the Padang Panjang City Center Market, which has a high activity intensity and a dense flow of vehicles.

$$Z = \frac{PSU \times D}{T} \quad \text{..... (6)}$$

Where:

Z = Required parking space (PSU)

PSU = Peak volume of the tax based on the accumulated results data

T = Survey duration (hours)

D = Average parking duration (hours).

RESEARCH METHODOLOGY

This study uses a quantitative method regarding the *Technical Guidelines for implementing Parking Facilities* (Directorate General of Land Transportation, 1996). The research location is in the parking area of two-wheeled and four-wheeled vehicles of the Padang Panjang City Center Market, Jl. Imam Bonjol, West Padang Panjang District, West Sumatra. Data collection was carried out for three days at 08.00–13.00 WIB, representing the peak hours of market activity. The data used includes primary data and secondary data. Primary data was obtained through field surveys in the form of the Number of vehicles entering and exiting and the length of parking time. In contrast, secondary data was obtained from relevant agencies regarding the general condition of the location. The data collection process involved eight surveyors using a direct recording method. The analysis was carried out through the stages of preliminary and primary surveys to calculate the parameters of parking characteristics, including accumulation, duration, volume, *turnover rate*, and parking index. Furthermore, the need for parking space is calculated based on the volume of vehicles at peak hours multiplied by the Parking Space Unit (PSU) value.

RESEARCH AND DISCUSSION

Data

The research data were obtained from a field survey conducted at the Padang Panjang City Center Market for three days: Monday, July 07, 2025; Wednesday, July 09, 2025; and Friday, July 11, 2025. Observations were made at 08.00–13.00 WIB, which is the peak hours period of market activity. The data recorded includes the Number of vehicles entering and exiting, with identification based on the police number of each vehicle.

Result

Parking Accumulation

Accumulated parking is the Number of vehicles parked at a location in a certain time interval. The accumulated value can be calculated using the equation:

Parking Accumulation = Qin – Qout + QS

Qin is the Number of vehicles in, *Qout* is the Number of vehicles out, and *QS* is the Number already existing at the beginning of observation. As an illustration, the calculation of parking accumulation can be seen in Table 5, which presents data from the results of a motorcycle survey on Friday, July 11, 2025.

Table 5. Example of Parking Accumulation Calculation

Time	Enter	Out	Accumulation
< 08.00	130		130
08.00 – 08.30	99	75	99
08.30 – 09.00	95	69	95

(Source of Calculation Results)

The overall parking accumulation data is presented in Tables 6 and 7, all the calculation results accumulate at intervals of 30 minutes.

Table 6. Motorcycle Accumulation

Day	Time	Parking Accumulation
Monday, July 07, 2025	10.00 – 10.30	156
Wednesday, July 09, 2025	10.30 – 11.00	107
Friday, July 11, 2025	08.30 – 09.00	180

(Source: Calculation Results)

Table 7. Car Accumulation

Day	Time	Parking Accumulation
Monday, July 07, 2025	11.30 - 12.00	87
Wednesday, July 09, 2025	11.00 - 11.30	47
Friday, July 11, 2025	10.00 - 10.30	105

(Source: Calculation Results)

Parking Duration

Parking duration is the time a vehicle is in the parking area. The duration calculation is done using the equation:

D = All – Tin

Tin is when the vehicle enters, and *Tout* is when the vehicle exits. An example of the calculation of parking duration is shown in Table 8, which presents the results of the motorcycle survey on Friday, July 11, 2025. The calculation of the average duration can be seen in Table 8.

Table 8. Average duration

Day	Average duration/hour	
	Motor	Car
Monday, July 07, 2025	1,36	1,42
Wednesday, July 09, 2025	1,24	1,4
Friday, July 11, 2025	1,54	1,48
Average	1,38	1,43

(Source: Calculation Results)

Parking Volume

Parking volume is the Number of vehicles that use the parking area in a certain period. The calculation can be done with the formula:

Parking Volume = Qs + Qin

Qs is the Number of vehicles already present at the beginning of the observation, and Qin is the Number of vehicles that entered during that period. An example of the calculation of parking volume is shown in Table 9 based on the results of a motorcycle survey on Friday, July 11, 2025.

Table 9. Parking Volume Calculation

Time	Enter	Out	Volume
< 08.00	130		130
08.00 – 08.30	99	75	99
08.30 – 09.00	95	69	95

(Source: Calculation Results)

Parking volume is calculated using the equation:

Parking Volume = Qs + Qin

The calculation of parking volume for each 30-minute interval is presented in detail in Appendix 1. The calculation of the overall volume at peak hours is shown in Table 10.

Table 10. Volume of Motor Vehicles and Cars

Day	Vehicle Volume	
	Motorbike	Car
Monday, July 07, 2025	748	287
Wednesday, July 09, 2025	532	171
Friday, July 11, 2025	841	291

(Source: Calculation Results)

Parking Turnover Rate

The parking turnover rate measures the frequency of parking space utilization in a given period. The calculation is done by dividing the parking volume by the Number of available parking spaces, as shown in the following formula:

Parking Turnover Rate = Qp / (Parking Lots Available)

The results of calculating the parking turnover rate for motorcycles and cars are presented in Tables 11 and 12.

Table 11. Motorcycle Parking Turnover Rate

Day	Parking Volume	Available Parking Space (PSU)	Turn Over
Monday, July 07, 2025	748	130	5,75
Wednesday, July 09, 2025	532	130	4,09
Friday, July 11, 2025	841	130	6,46

(Source: Calculation Results)

Table 12. Car Parking Turnover Rate

Day	Parking Volume	Available Parking Space (PSU)	Turn Over
Monday, July 07, 2025	287	70	4,1
Wednesday, July 09, 2025	171	70	2,45
Friday, July 11, 2025	291	70	4,15

(Source: Calculation Results)

Parking Index

Parking index is the ratio between the Number of vehicles currently parked (accumulated)

and the available parking capacity at a location. This value is used to assess the level of utilization of parking facilities. The calculation of the parking index can be done with the formula:

Parking Index = Accumulated Parking / Parking Capacity

The results of calculating the parking index for motorcycles and cars are shown in Tables 13 and 14.

Table 13. Motorcycle Parking Index

Day	Parking Accumulation	Number of Parking Spaces	Parking Index
Monday, July 07, 2025	156	130	1,20
Wednesday, July 09, 2025	107	130	0,82
Friday, July 11, 2025	180	130	1,38

(Source: Calculation Results)

Table 14. Car Parking Index

Day	Parking Accumulation	Number of Parking Spaces	Parking Index
Monday, July 07, 2025	87	70	1,24
Wednesday, July 09, 2025	47	70	0,67
Friday, July 11, 2025	105	70	1,50

(Source: Calculation Results)

Parking Space Requirements

The need for parking space is the Number of spaces or parking spaces needed to accommodate parked vehicles. The need for parking space can be seen in Table 15.

Table 15. Motorcycle and Car Parking Space Requirements

Parking Space Requirements Parameters	Motorbike	Car
Number of Vehicles (PSU)	841	291
Observation Time Length (T)	7	7
Average Duration (D)	1,38	1,43
PSU Required (z)	166	60
PSU Available	130	70
Requirements of PSU (Z - PSU Available)	36	-10

(Source: Calculation Results)

Discussion

Parking Accumulation

Based on the analysis results, the peak of motorcycle parking accumulation at the Padang Panjang City Center Market occurred on Friday, July 11, 2025, at 08.30–09.00 with 180 vehicles. Meanwhile, the peak of car parking accumulation occurred on the same day at 10.00-10.30 with 105 vehicles. This condition shows that the highest parking load in the market area tends to occur in the morning when trading activity reaches its highest intensity.

These results align with relevant research conducted by Saifudin (2021) on the Karangpandan Market, which found that the peak of market parking accumulation also occurred in the morning. This indicates a general pattern in traditional trade areas, where the mobility of visitors and traders is concentrated in the early hours of activities.

Thus, identifying the peak time of parking accumulation is important as a basis for planning the provision of adequate parking space, to reduce the potential for vehicle accumulation, illegal

parking, and traffic flow disturbances around the market.

Parking Duration

Based on research over three days, it was shown that the average duration of motorcycle parking reached 1.38 hours per vehicle, while the average duration of car parking was 1.43 hours per vehicle. This finding aligns with Saifudin (2021) research at the Karangpandan Market, which shows that the average duration of vehicle parking generally exceeds one hour. This condition reflects that the majority of parking lot users are buyers who visit to shop for household needs and kitchen materials.

Parking Volume

The peak volume of motorcycle parking at the Padang Panjang City Center Market occurred on Friday, July 11, 2025, with a total of 841 vehicles, while the volume of car parking reached 291 vehicles on the same day. This condition shows that the Number of vehicles that come exceeds the capacity of the available parking space. This finding aligns with Stefanus (2022) research on parking needs at Pengging Market, Boyolali Regency, which indicates the limited parking space compared to the high volume of visitor vehicles.

Parking Turnover

Based on the research results, the highest parking turnover rate for motorcycles in the Padang Panjang City Center Market occurred on Friday, July 11, 2025, with a value of 6.46 vehicles per plot. Meanwhile, the highest parking turnover rate for cars on the same day reached 4.15 vehicles per square. This condition shows that on days with dense market activity, the frequency of parking space use increases significantly, requiring more optimal management.

Parking Index

The highest motorcycle parking index in the Padang Panjang City Center Market occurred on Friday, July 11, 2025, with a value of 1.38 vehicles per plot. Meanwhile, Figure 26 shows that the highest parking index of cars on the same day reached 1.5 vehicles per plot. Parking index values exceeding 1 (IP > 1) indicate that the parking lot capacity cannot accommodate the Number of existing vehicles. These findings are consistent with research at the Pengging Market in Boyolali Regency, which also shows that the parking index exceeds the available capacity.

Parking Requirements

The need for motorcycle parking space at the Padang Panjang City Center Market is 166 PSU, while the available parking space is only 130 PSU. This shows a shortage of 36 SRPs that must be added to meet the needs. On the other hand, the need for car parking space is recorded at 60 PSU, with the availability of 70 PSU, so there is still a surplus of capacity and does not require additional capacity. This finding aligns with research at Pengging Market, Boyolali Regency, which shows that the need for parking space often exceeds the capacity of available land.

CONCLUSION

Based on the analysis and discussion, the characteristics of the parking space at the Padang Panjang City Center Market showed the highest condition on Friday, July 11, 2025. The accumulated parking reached 180 vehicles for motorcycles and 105 vehicles for cars. The average parking duration is 1.38 hours/vehicle for motorcycles and 1.43 hours/vehicle for cars. The highest parking volume was recorded at 841 vehicles for motorcycles and 291 vehicles for cars. The parking turnover rate reached 6.46 vehicles/plots for motorcycles and 4.15 vehicles/plots for cars. The parking index was 1.38 vehicles/plot and 1.5 vehicles/plot, respectively, indicating that the parking capacity had exceeded the standard limit (IP > 1). The

need for parking space for motorcycles is 166 PSU, with the availability of 130 PSU, so there is a shortage of 36 PSU. Meanwhile, the need for a car parking space of 60 PSU can still be accommodated with the availability of 70 PSU. However, it is necessary to rearrange the parking pattern so that the land capacity can be used optimally.

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