International Jurnal of Sustainable Building, Infrastucture and Environment

PONCOL SEMARANG STATION PARKING CAPACITY ANALYSIS

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Abstract. *Currently, train stations are still busy for train passengers, parking capacity requirements are also being considered. This research is motivated by the problem of parking capacity, where there are several points that cause congestion and the direction of the parking lane is less than optimal at Poncol Semarang Station. In overcoming this problem, it is necessary to analyze parking capacity, evaluate problems and alternatives that can be used to solve existing problems. The method used in this research is a descriptive approach. This means that the data collected is not in the form of numerical data, but rather data originating from interview scripts, field notes, personal documents, researcher notes or memos and other official supporting documents which aim to enable researchers to describe the empirical reality behind the conditions that occur at train stations. Poncol Semarang. This research produces parking capacity at the station where the parking area can accommodate 554 SRP for cars and 241 SRP for motorbikes with the most parking accumulation getting the most results on Sunday, August 20 2023, namely in the morning at 06.00-09.00 WIB. Amounting to 157 motorbikes and 100 cars. Alternatives for handling traffic jams during peak parking hours are: moving the motorbike taxi post, improving the direction of the parking lane and moving entrance 2.*

Keywords*: parking, capacity, alternative, station*

1. Introduction

The demand for motorized vehicle parking is one of the problems in public places such as shopping centers, markets, hotels, train stations, etc. The problem arises mainly because the need increases every year, in line with the growth in the use of public transportation in Indonesia. To meet the need for motorized vehicle parking space in office areas, terminals or train stations. The situation at Semarang

Poncol Station on weekdays is that the parking is not too full, however there are several days where the increase in parking volume increases, namely on weekends (Saturday and Sunday) and national holidays.

At Poncol Station, parking conditions are sufficient to meet the facilities and infrastructure for the needs of train station users. However, there are several things that must be considered regarding the available capacity in the station area, considering that the number of users of station facilities is starting to increase so it is necessary to analyze the types of vehicles in the parking area and there are several problems regarding congestion on the entrance route due to several online motorbike taxis, taxis and vehicles others prefer to park (standby) outside the station area for quite a long time, so that at certain times the volume of vehicles entering the station peaks, causing congestion in the road area around Poncol Semarang Station.

An analysis of the need for parking space is needed by obtaining the SRP (Parking Space Unit), knowing the maximum capacity in the parking area, and the majority of vehicles entering the Poncol train station parking area. Determination of Parking Space Units is based on the type of vehicle, the size of the parking space in square meters (Directorate General of Land Transportation, 1998). Parking Space Requirement is the number of spaces needed to accommodate vehicles that require parking based on the facilities and functions of a land use plan. To find out the parking needs in a study area, you first need to know the location of the parking area.

Based on the description above, research related to parking capacity analysis at stations is very important to find out whether the existing parking capacity is sufficient or still needs to be increased. By conducting a parking capacity analysis, it is possible to determine the number of vehicles that can be accommodated in the station parking area, so that necessary corrective steps can be taken to overcome limited parking capacity.

Scope of Problem

The limitations of this problem need to be used so that the research is focused and not extensive. The problem limitations are as follows:

1. Location survey of the Poncol Station parking area in Semarang
2. Survey times are carried out on Monday, Friday and Sunday (06.00 - 09.00, 11.00 - 14.00, 17.00 - 20.00)

2. Literature Review

Parking Definition

The origin of the word parking itself comes from park, which means garden, and according to the Big Indonesian Dictionary, it is a storage place. According to the Directorate General of Land Transportation Number 272/HK/105/DRJD/96 concerning Technical Guidelines for the Implementation of Parking Facilities, parking is a non-temporary state of immobility of a vehicle. Meanwhile, the definition of stopping is that the vehicle does not move from the vehicle temporarily and the driver does not leave the vehicle (Department of Transportation, 1996)

Parking Space Unit

Parking space unit (SRP) is a measure of the effective area for placing a vehicle (passenger cars, buses, trucks, motorbikes) including clearance and door opening width. In other words, SRP can be defined as a space requirement for parking a vehicle safely and comfortably with the most efficient use of space possible. (Septyanto Kurniawan, 2017)

The length and width of the parking space are usually adjusted to the size of the parked vehicle. While the size of the vehicle varies, the determination of the parking space unit (SRP) can be seen in the table below:

Table 1 Determination of Parking Space Units (SRP)

No	Jenis Kendaraan	Satuan Ruang Parkir
1	Mobil penumpang untuk golongan I Mobil penumpang untuk golongan II Mobil penumpang untuk golongan III	2.30 x 5.00 2.50 x 5.00 3.00 x 5.00
2	Bus / Truk	3.40 x 12.50
3	Motor	0.75 x 2.00

Sumber: Direktorat Jendral Perhubungan, 1996

Based on the guidelines for Determining Parking Space Units above, the things that are taken into consideration in determining the size of the parking space unit for each type of vehicle are as follows:

1. Parking Space Unit (SRP) for passenger cars

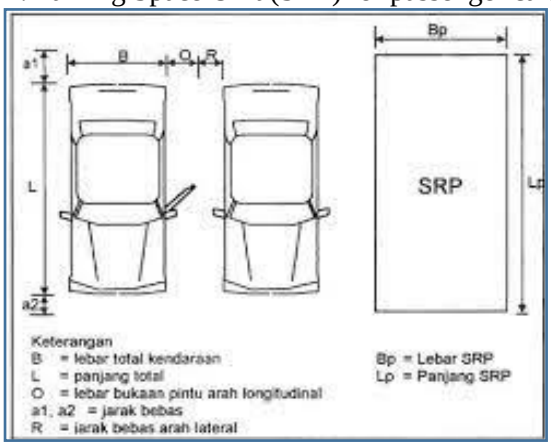

Figure 1 Standard Vehicle Dimensions for passenger cars
Source: Directorate General of Communication and Information 1996

2. Parking Space Unit (SRP) for motorbikes

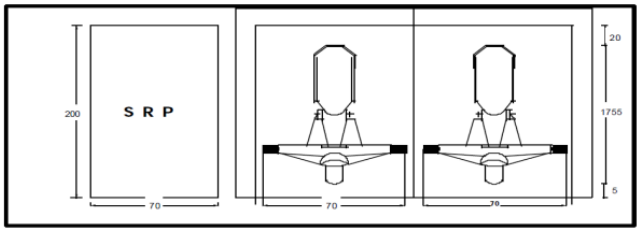

Figure 2 Standard Vehicle Dimensions for motorbikes
Source: Directorate General of Communication and Information 1996

Parking spaces for bicycles are usually found in public places such as train stations, bus terminals, shopping centers, office buildings, universities, and so on. The function of a parking space for bicycles is to provide a safe and comfortable place for cyclists to park their bicycles while carrying out activities or visits at that place.

The choice of parking angle is greatly influenced by the number of parking spaces needed in addition to the area of the land. Choosing a good parking angle will provide the optimal number of places and also good space for movement. How many forms of parking angle selection are:

1. Parallel Parking System/On flat areas

The formula used: N = L / 600

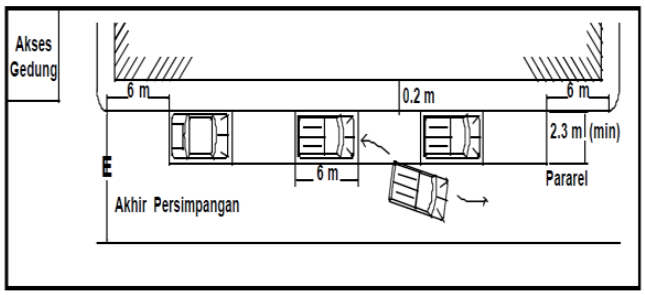

Figure 3 Parallel Parking

Source: Directorate General of Communications, 1996

2. Angle 30º

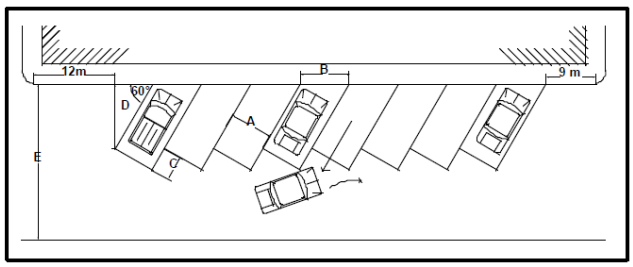

Figure 4 Angle 30º

Source: Directorate General of Communications, 1996

3. Angle 45º

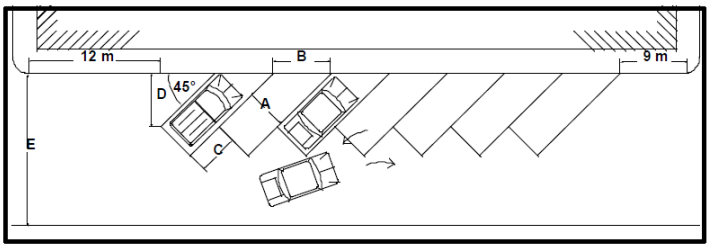

Figure 5 Angle 45º

Source: Directorate General of Communications, 1996

4. Angle 60º

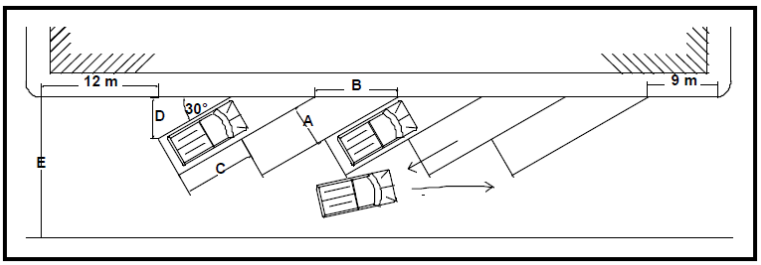

Figure 6 Angle 60º

Source: Directorate General of Communications, 1996

5. Angle 90^{o}

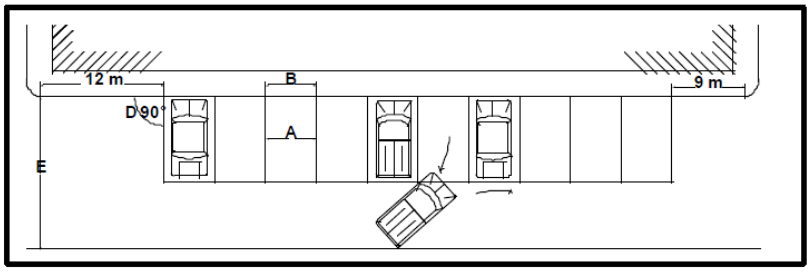

Figure 7 Angle 90^{o}
Source: Directorate General of Communications, 1996

3. Research Methods

Time and Place

Implementation times are based on predetermined sample days, namely Monday, Friday and Sunday at 07.00, 12.50, 17.49, 19.05. This time was determined based on the website page as a result of an interview with Public Relations of KAI DAOP 4 Semarang, Ixfan Hendri Wintoko, who said that the train that is still the favorite this year for the Poncol station is the Aambarawa Express bound for Pasarturi and Kaligung – Tegal.

Type of Observation / Research

Researchers collected data by surveying directly to the location and conducting interviews with the Poncol Station parking management to obtain the required data and information.

Data Collection

1. Primary data is the main data, which is in

obtained from the results of field observations carried out at Poncol Station, Semarang, by recording vehicles parked at the research location. The primary data needed in this research are:

a. Parking Condition Survey

b. Parking Area Situation

c. Parking Patterns in the Poncol Station Area

2. Secondary data is data that

Supports the discussion process obtained from the KAI Indonesia website, which discusses train departure schedules and other related information. The primary data needed in this research are:

a. Station Geometry Conditions

b. Parking Volume Data on Certain Days

c. Data from the majority of Poncol Station users

d. Train Departure Schedule Data

Tools Used

The tools used in the research are:

a. Blank / research form

b. Stationery and boards for writing aids.

c. Watch or timekeeper.

d. Computer / laptop as a data processing tool.

e. Meter

Measuring and Implementing Parking Observations

Measurements and parking observations are carried out on the day Monday, Friday and Sunday at 07.00, 12.50, 17.49, 19.05. Semarang Poncol Station with observations including:

a. Parking Accumulation Analysis

b. Parking Duration

c. Parking Capacity

d. Parking Volume

e. Perkirt Change

f. Parking Index

g. Parking Needs Analysis

4. Results And Discussion

Parking Characteristics

The parking area of Poncol Station is 4094 m², so from the survey results the maximum parking area usage is only 36.94% of the total area with the off street parking type using a 900 angle for the observation period starting 1 hour from the predetermined schedule with a research time of 3 hours . The research is to record the number of vehicles entering and exiting from gate 1 and gate 2. The results of this data are used as a comparison to find out when the peak time occurs for the capacity that Poncol Semarang Station can accommodate.

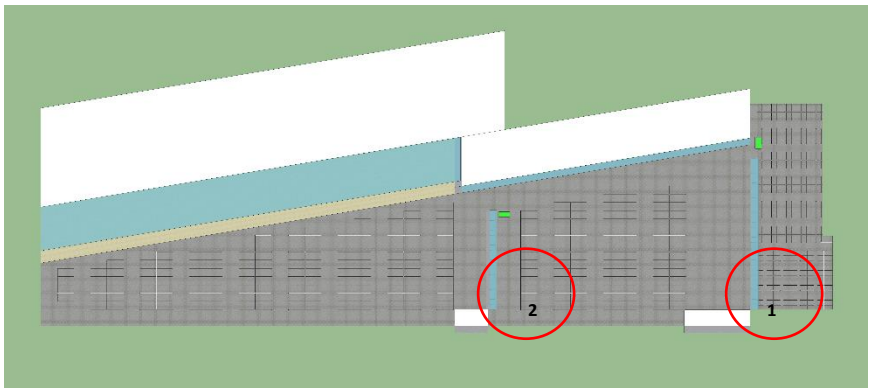

Figure 8 Plan of Existing Poncol Station Parking Space
Source: Researcher, 2023

In the plan above, it can be seen that gates 1 and 2 are congestion points that occur when the volume of visitors to the Poncol station increases. This traffic jam is caused by online motorcycle taxi users who pick up and drop off at the station entrance area and the online motorcycle taxi waiting post provided by the station is too far from the entrance area. This will make the online motorcycle taxi take longer. Wait in front of the station parking access entrance.

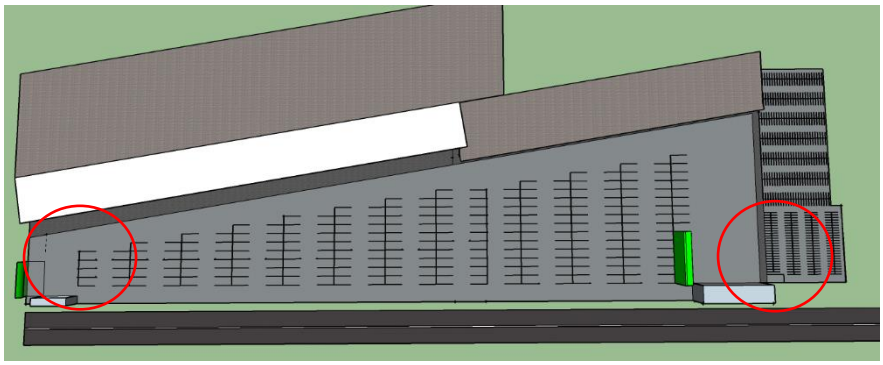

Figure 9 Alternative Parking Spaces at Poncol Station
Source: Researcher, 2023

An alternative that can be used is to move entrance 2 to the left corner of the parking area, this can be seen apart from reducing traffic jams because the entrance is too close. This alternative can further optimize the parking lane into one direction, of course this is very helpful for Parking users are looking for empty spaces that are not yet occupied. The capacity after this transfer is still the same, the parking area can accommodate around 282 SRP for LV and HV. At the Poncol station, the number of MC vehicles is 282 SRP, then LV is 189 SRP and HV is 52 SRP. The parking size used is 5m x 2.5m for LV and HV vehicles, while 1.5m x 2.5m for MC vehicles. The angle used in the parking area is 90^0

Table 2 Parking Capacity

Hari / Tanggal	Kendaraan Sepeda Motor			Kendaraan Mobil		
	Pagi	Siang	Sore	Pagi	Siang	Sore
Senin, 14 Agustus 2023	108	91	71	54	33	54
Jumat, 18 Agustus 2023	139	10	96	56	59	67
Minggu, 20 Agustus 2023	157	134	118	100	61	70

Sumber: Peneliti 2023

The results of the capacity research at the Poncol station with a research sample of 3 days, namely Monday, Friday and Sunday, were divided into 3 times, namely morning (06.00-09.00 WIB), afternoon (11.00-14.00 WIB) and afternoon (17.00-20.00 WIB). This time is determined according to the train schedule which is the most popular with the highest number of train users, namely the departure time for the Ambarawa Express for Surabaya-Pasarturi at 07.00 WIB and Kaligung for Tegal at 12.50 WIB. The highest accumulated results are on Sundays, namely in the morning at 06.00-09.00 WIB. Amounting to 157 motorbikes and 100 cars.

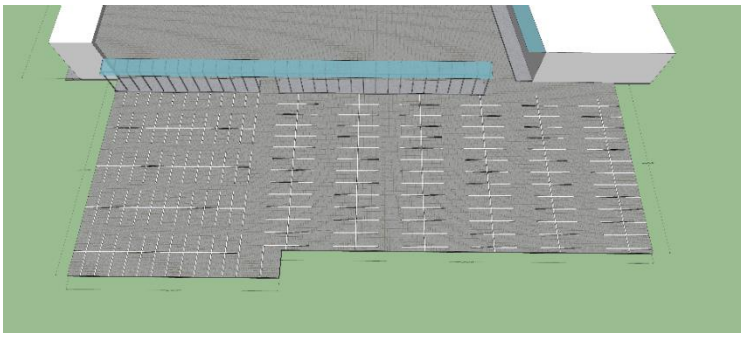

Figure 9 Motorcycle Parking Area Plan
Source: Researcher, 2023

The size of the Parking Space Unit (SRP) at the Poncol station is 0.75m x 2m. This size is in accordance with the SRP determination standards. The number of motorbikes that can be accommodated is 554 SRP. Meanwhile, for cars the size used is 5 m x 2.5 m. The number of vehicles that can be accommodated is 241 SRP

5. Conclusion

The highest parking capacity at Poncol Station occurs on Sundays (weekends), with the number of SRP available for motorbikes of 554 SRP and cars of 241 SRP. The SRP unit size for motorbikes is 0.75 m x 2 m, while for cars it is 5 m x 2.5 m. The peak time obtained from the analysis of parking accumulation results is that the highest results are on Sundays (weekends), namely in the morning at 06.00-09.00 WIB. Amounting to 157 motorbikes and 100 cars.

There are several alternative parking arrangements that can be used, namely by moving the motorbike taxi waiting post to a position closer to the entrance. This is expected to make it easier for online motorcycle taxis not to wait long at the entrance area so as to reduce congestion at the entrance. Then the next alternative is to change the position of the parking lane to one direction. This can optimize and make it easier for parking users to find empty parking spaces.

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