

Study of Parking Needs in Mont Blanc Tower and Athena Tower at Belmont Residence Apartment

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Submitted: November-December 2022, Revised: January 2023, Accepted: February 22, 2023

Abstract. The ratio for parking spaces is determined based on the number of residential units, the ratio is based on the government standards, but some apartments do not follow the standards due to the undeveloped parking system, for example, in Belmont Residence Apartment in West Jakarta. The research used descriptive-interpretative methods by observing the data and revealing the problems that cause the failing parking system. The solution to the unusual parking space ratio in Belmont Residence Apartment is to apply a rotary parking system that provides more parking slots in tight spaces, and it aims to maximize the use of the narrow field by stacking up the parking space vertically.

Keywords: Parking spaces; Ratio; Rotary Parking System; Belmont Residence Apartment

INTRODUCTION

In Belmont Residence apartments, the parking ratio fulfills the number of residents; the parking spaces are not sufficient by the number of apartment residents. The residents' parking spaces are not adequately occupied because guests from outside the residence area park their vehicles in the residence area. This is detrimental to apartment residents because some residents become threatened to park their vehicles in the apartment area with reduced parking space. The area accessed by residential residents has an entrance leading to the Mont Blanc tower. The access is closed due to social problems between residents and housing around the apartment [1].

According to residents who live near the apartment area, parking lots in some residential areas disrupt access to housing; in addition, residents feel isolated because their activities are limited by parking lots that are a sign of ownership areas. This incident started from a gated community that limits apartment residents and immigrants; from a security perspective, apartment buildings offer security services according to management standards, but this impacts the surrounding environment. Who are not residents of the apartment? Before the parking lot area near the residential area was closed, the area was not supervised by the apartment's security; therefore, some housing residents felt that the area was public land that could be used together. Because this condition gave rise to conflict, the apartment decided to close access to residential areas. The impact of this decision has another effect, namely the use of parking spaces in the front area of the apartment shop. Since the beginning of the Belmont [2] Residence apartment, the shophouse area does not have a transparent parking system because no person manages the land day and night. The parking area in the shophouse is intended for shop tenants, but because of the limited parking space in the apartment area, some residents are forced to park their vehicles in the shophouse area. The emergence of this problem impacts shop parking lot users who are hampered because of parking slots that residents and visitors have filled to the apartment.

The purpose of this writing is to conduct a study that produces a parking coordination system for Belmont Residence apartments; the process undertaken in conducting studies is based on research and location surveys so that the output provided can be adjusted to the needs at the research site. The needs of parking lots are determined by the standards provided by the central government, which would be used as the primary reference in conducting the research process, which aims to find out the needs of parking slots by established standards. In addition, another goal is to make comparisons based on standards that have been set with buildings, built as an example in the application of designs that are by the needs of parking lots. An integrated parking system is an idea or idea in this research because an integrated parking system can impact the effectiveness of users and visitors to the apartment.

MATERIAL AND METHOD

Parking regulations

Building Management and Supervision Agency Number 7 of 2010 states; the ideal parking in apartments has a ratio of 1:1 and stipulates that each occupant has one parking according to the number of apartment units. However, the regulations cannot be fulfilled due to land limitations, so there are some adjustments imposed by the Building Structuring and Supervision Office, including the following: [3]

- If the apartment has a building area of more than 150 m², one unit at least gets a parking spot for one car.
- If the apartment has a building area between 50 to 150 m², then one parking spot is an allotment for two residential units.
- If the apartment has a building area of less than 50 m², then one parking spot is an allotment for five residential units.

They need parking space that needs to be considered; another thing that needs to be considered is the size of the parking lot; based on the regulations of the Building Structuring and Supervision Office in the correct position, the ideal parking has a size of 2.25m x 4.5m, while in an equal position the ideal size is 2.25m x 6m [3].

Regulations from the Office of Building Management and Supervision. The governor can regulate regulations regarding parking arrangements in DKI Jakarta. The regulation states that the developer must spend 1 spot of car parking and 5 motor parking spots for 10 residential units. Parking needs set by the government are adjusted to the ratio of area per unit of the building; in this research category, the building has a function as an apartment (vertical occupancy). In the building site, parking needs can be adjusted to the building land area, but in vertical buildings, the number of parking slots is determined by the area per unit of the building [3].

Research Methodology

In this study, the method used is a method of interpretive description of field data collection done by: (1) observing the subject of study by exploring what the problem is; (2) conducting a brief interview with the occupants of the apartment to obtain relevant data related to the ongoing problems, in addition to getting the latest information that may not have been publicly reported; (3) describe what the problems are and what factors affect them, to provide relevant advice or solutions and also by the problems that occur. Then qualitative analysis through several stages; (1) reduce data that can be used in research; (2) categorize data according to its classification; (3) present tables that aim to simplify the analysis process [4]. The results of this study are presented in the form of data according to the study's title. This study describes what problems occur and provides suggestions or input as solutions to issues related to the object of this research.

Prior research on parking systems in some existing apartments included (Table 1):
TABLE 1 Prior Research

| No. | Heading | Description | Source |
|-----|--|---|---|
| 1 | Apartment CBD Polonia | Case studies from CBD Polonia Apartment as one of the references that apply an effective parking system | Journal of Science and Technology ISTP, Vol. 12, No. 1 [5] |
| 2 | Application of Modular Building Coordination System on Vertical Residential Design of TJ Apartments | This paper discusses the analysis of a modular parking coordination system to create efficiencies for residents and visitors. | Journal of Reka Karsa, Vol. 4, No. 4 [6] |
| 3 | Analysis of Parking Capacity in Student Apartment Building Case Study: Student Castle Apartment & Vivo Apartment | Analysis of parking capacity needs to be based on case studies on apartments that have been built | <i>Seminar Karya & Pameran Arsitektur Indonesia: Sustainability in Architecture</i> [2] |
| 4 | Review of Standardization of Parking Room Unit (SRP) Needs for Apartments in Surabaya | This journal discusses the study in the needs of parking lots that become standard in determining SRP based on apartment case studies in Surabaya | Journal spectra, Vol. 1, No. 24 [1] |

Case Study: Mont Blanc Tower and Athena Tower

Belmont Residence Apartment has 3 types of towers: Athena, Everest, and Mont Blanc. This apartment is located on Jalan Meruya Ilir Raya, RT.8/RW.7, Srengseng, West Jakarta (Figure 1).



FIGURE 1. Apartment Belmont Residence, Mont Blanc & Athena Tower
Source: Google Streetview, downloaded October 10, 2021

The environment of Belmond Residence apartment is in an area with high economic growth and ease of access from the main road making this apartment one of the apartments targeted by workers. The apartment's location is quite strategic, with an office area that has a potential for selling value (Figure 2, 3). The apartments are surrounded by residential and commercial buildings with numerous visitors from all around, and the environment is a growing, pace economy with high demands of living. The apartments have some advantages due to the surroundings with high activity especially offices with lots of workers.

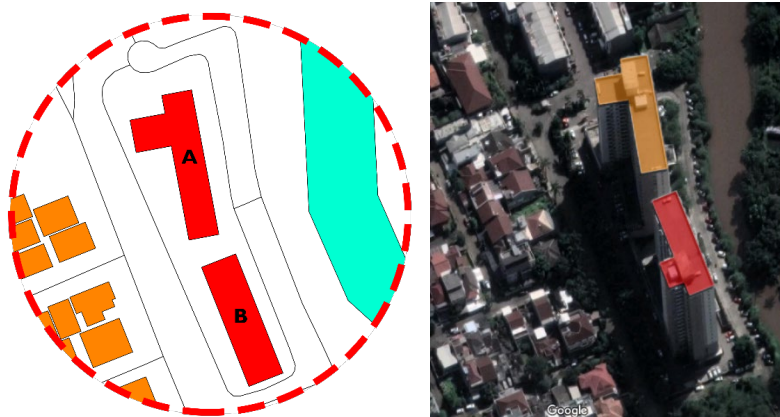


FIGURE 2. Location of Belmont Residence Apartment, Mont Blanc Tower & Athena Tower
Source: Google Maps, downloaded October 10, 2021



FIGURE 3. Access to Belmont Residence Apartment
Source: Google Maps, downloaded October 10, 2021

Both Mont Blanc and Athena towers have a parking system integrated by creating a connected basement parking to facilitate circulation for residents on both towers; the number of parking spots in the basement and on the apartment site area amounted to 125 spots. In table 1, the total number of units of Mont Blanc Tower and Athena Tower amounted to 958 units, based on the number set by the Building Structuring and Supervision Office, the amount of parking that needs to be provided amounts to 192 parking slots, the number that now exists at the location is not by the regulations that have been set.

Parking needs are one of the issues that occur in Belmont Residence apartments because this affects the amount of parking slot capacity that is not directly proportional to the number of units in the apartment, the area per apartment unit determines parking space needs by regulations set by the central government, following data based on Belmont residence apartment developers (Table 2).

TABLE 2. Unit type size data

| No. | Name of Tower | Unit Size | Number of Units per Floor |
|-----|------------------------------|--|---|
| 1 | Mont Blanc Tower (29 floors) | Studio Type (25 m ²) Type 1 Bedroom (36 m ²) Type 2 Bedroom (45 m ²) | Number of units per floor: 16 units Studio Type (4 units) Type 1 Bedroom (6 units) Type 2 Bedroom (6 units) Total units: 464 units |
| 2 | Athena Tower (26 floors) | Studio Type (25 m ²) Type 1 Bedroom (36 m ²) Type 2 Bedroom (42 m ²) | Number of units per floor: 19 units Studio Type (5 units) Type 1 Bedroom (7 units) Type 2 Bedroom (7 units) Total units: 494 units |

Source: Belmont Residence Developer, 2021

To be able to access the basement parking, residents must pass through the main door and then enter the Mont Blanc tower area (Figure 4), for basement exit access located in the Mont Blanc tower area considering the circulation set to be able to access directly to the exit of the apartment tower. The site's parking area becomes very crowded at certain hours because of visitors or relatives of apartment residents who come to visit. The parking area of the parking lot is provided for tenant tenants in the lobby of the apartment, for the capacity of cars that can be accommodated is per 1 tenant gets 2 parking slots. The tenant's area can be used as public parking if the tenants are unoccupied, but in the current condition of the tenant's area are used mainly by visitors to park the vehicle.



FIGURE 4. Basement parking access
Source: Authors, 2021

RESULT AND DISCUSSION

Belmont Residence apartment parking conditions

In Srengseng neighborhood, there is a high enough density of seating; this is intended through the number of commercial buildings and vertical dwellings that crowd the area and the high population density of transportation modes to be one of the means used daily activities. In the apartment environment, most residents use private vehicles for activities and activities carried out in the morning to evening. Based on the data that has

been collected, the number of parking spots provided by the developer for both towers amounted to 125 spots but based on the reference data provided by the Building Structuring and Supervision Office.

The manager provides a spot in the tenant area as a tenant parking area, but visitors now use the area as a public parking area. On weekdays this parking area is not too crowded, but on weekends the area is crowded by visitors from outside the apartment (Figure 5).



FIGURE 5. Parking conditions of tenant lobby apartment area
Source: Authors, 2021

The parking lot does not park the vehicle according to its designation. Because some residents put parking in the shophouse area near the entrance to the Belmont Residence apartment, the lack of parking spots is also influenced by parking areas that are not accessible to residents. However, the area's status is still in the apartment area because of the social gap between residential residents and the manager resulting in the land not being used by apartment residents (Figure 6).

This parking area was initially used as a parking lot for apartment residents, but access to the area is now closed due to territorial problems experienced between apartment residents and residential residents across apartments. Because there are no barriers or separating signs, this creates a territorial problem that does not have clarity of land territory between apartment residents and residential residents.



FIGURE 6. Site parking area near residential residents
Source: Google Streetview, downloaded October 10, 2021

In Mont Blanc and Athena's towers have high-density residents, the ratio for the low mobility residents and the high mobility residents is 60:40, which means the low mobility residents have a higher amount than the high mobility. The amount is based on the weekend because residents will most of the time in the unit due to the covid situation and minimizing the outdoor activity. Most residents with high levels of mobility are workers who move from morning to evening; conditions on weekdays affect parking capacity due to the large number of residents who go out to work. While on weekends, residents can crowd the parking area, which is influenced by the number of visitors who come to the apartment (Figure 7). On weekdays, the ratio changed because the number of high mobility residents is higher than the number of low mobility residents; In conclusion, the

number of parking slots available during the weekdays is higher than the number of parking slots on the weekend.



FIGURE 7. The density of lobby parking area
Source: Authors, 2021

The parking lobby can accommodate 40% of the total apartment parking, but because it can only accommodate 40%, residents must hunt in parking their vehicles because the parking ratio is not by the number of units and not by government regulations. In addition, if visitors filled the parking area, it would reduce the parking slots for the residents who live in the apartment. This is also one of the factors why most residents end up parking their vehicles in the parking area of shophouses in front of the apartment area another reason; why residents park their vehicles in the shophouse area is because of the accessibility that is easier to reach to access the main road (Figure 8). There is an arrangement of parallel parking between cars that leads to the building lobby; there are 50 slots in the apartment lobby area (Figure 9). Parking in the lobby area is in the vehicle entrance area.



FIGURE 8. Meruya Ilir Highway
Source: Authors, 2021



FIGURE 9. Parking of the apartment lobby area
Source: Authors, 2021

Rotary Parking System

The proposed system allows the apartment to maximize the land use of the narrow area, and also, by maximizing the capacity of the parking slot, it will allow more guests to park their cars in the apartment area. The rotary parking system uses electricity as its primary power resource, but as time goes by, some energy alternatives can be used to produce much cleaner energy, such as wind generators, solar systems, and many more. It is also an issue that if the tower is fully occupied, it will generate more power to balance its rotary system [7]. The system requires some base components to operate, such as; a power supply to provide the voltage needed to run the primary components, I/O Modules that provide signal conversion, and isolation between the internal logic level signals. The processor provides intelligence to command the activities to the entire system [8].

Another consideration to take was from the beginning before the building was constructed because the amount of the parking slot must fulfill the standards. The result of the rotary parking system gives many advantages. Unlike the landed parking system, vertical parking gives more space for circulation and green areas in the horizontal area. Also, using a rotary parking system aims to reduce conflicts between the residents who live in the apartments and the residents of the landed housing, the parking area near the landed housing was closed due to social problems and lack of management between the apartment and the residents.

Using The rotary parking system is expected to maximize narrow land to increase the number of parking slots in the parking area of the apartment site. There are several advantages to using a rotary parking system: [9]

- 2 car parking can fit more than 6 cars
- Adopt a rotating mechanism to minimize vibration and noise
- Easy operational system
- Use the press button system
- High security
- Stable and reliable

Figure 10,11,12,13 is an overview of how a rotary parking system can be used by various vehicles ranging from small to medium-sized cars.



FIGURE 10. Rotary Parking System
Source: Authors, 2022

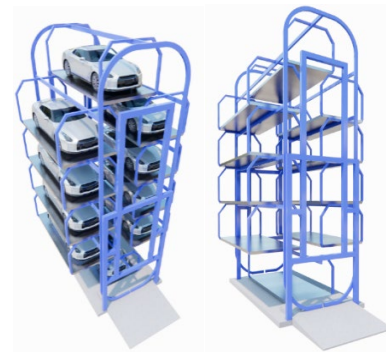


FIGURE 11. Rotary parking system structure
Source: Authors, 2022

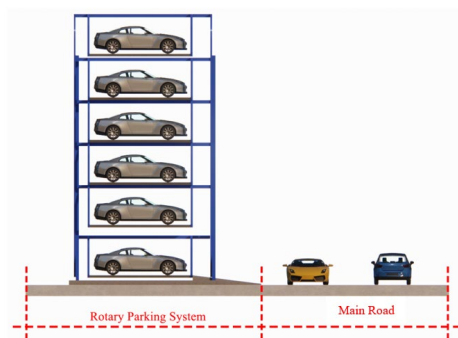


FIGURE 12. Diagram of the main road
Source: Authors, 2022

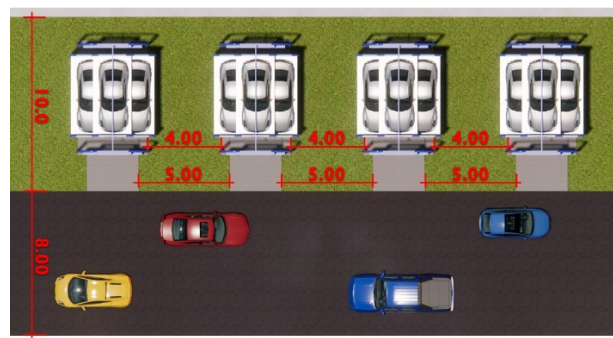


FIGURE 13. Parking tower placement plan
Source: Authors, 2022

In its operation, this rotary parking system is based on a push button that provides convenience for users to operate it. The mechanism that works is an automatic system that would adjust the slots that residents can use; here is an explanation of the stages in the rotary parking operating system: [10]

- 1) The driver enters the parking area (Figure 14).
- 2) The indicator light would show the available parking slot; the green light indicates the parking slot can be used; the red light indicates the parking slot is already filled by other vehicles



FIGURE 14. Illustration of a vehicle entering the parking tower
Source: Authors, 2022

- 3) The rotor on the tower would rotate, and the vehicle enters from the bottom area so that the driver can enter the parking slot (Figure 15).



FIGURE 15. Illustration of a vehicle entering the parking tower
Source: Authors, 2022

- 4) Once the vehicle enters, the driver returns to the control panel to press a button to complete the system circuit.
- 5) After the driver presses the button, the tower would automatically rotate according to the order of the parking slot based on the system (Figure 16).



FIGURE 16. Illustration of a vehicle entering the parking tower
Source: Authors, 2022

- 6) The driver presses the button according to the slot number where the car is parked
- 7) The rotor on the parking tower would rotate, directing the car to the bottom of the tower (Figure 17)



FIGURE 17. Illustration of a vehicle exiting the parking tower
Source: Authors, 2022

- 8) The car would stop at the bottom area of the parking tower, and after the rotor stops turning then, the vehicle can be removed from the parking tower (Figure 18)

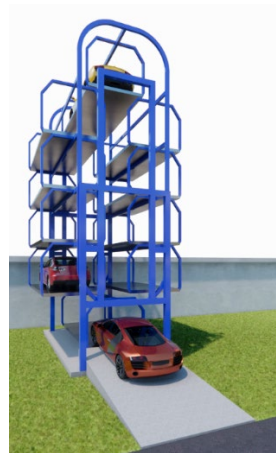


FIGURE 18. Illustration of a vehicle exiting the parking tower
Source: Authors, 2022

CONCLUSION

From the results and discussions that have been done, it can be concluded as follows:

- 1) Mont Blanc tower building and Athena tower do not meet the parking standards that have been set because it does not match the calculation of the ratio that has been set. One consideration is to use a vertical parking system to add the amount of parking in the basement area or to the tread parking area.
- 2) The rotary parking system is one of the solutions offered in responding to the availability of minimal land; by using a rotary parking system, the capacity to accommodate vehicles would increase 2-fold. However, it is better when doing the planning stage and the design stage can consider the needs of parking lots by the ratio.
- 3) As a suggestion, in the initial design stage, it is necessary to note and consider a parking system that meets the standard ratio by government regulations; the goal is for the comfort of fellow apartment residents and mutual comfort. In addition, if the parking ratio meets the standard, apartment residents do not need to park illegally in the shophouse area.

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