

Design of Multilevel Parking Lot in Kottayam Railway Station

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Abstract - Car parking has been a serious issue due to rapid increase in vehicles and to cater this problem we require parking slots in important market and city destinations. We have limited land resource, so the construction of multilevel parking is very important as it accommodates large number of vehicles at one place. Parking is a vital component of transportation. The number of passengers are increasing in Kottayam railway station but the parking of vehicles is a major concern as there is scarcity of land space. To cater the vehicles, multilevel car parking lots are necessary.

Key Words: Parking lots, Kottayam Railway station.

1. INTRODUCTION

Parking is one of the major and severe problems that is created by the increase in road traffic and this increase in vehicles occurs due to the impact of transport development. Space constraints in urban areas has increased the demand for parking space especially in areas like Central Business District. This affects the choice of mode and also has a great economic impact. Before taking any measures which help in the betterment of conditions, data collection regarding availability of parking space, extent of the usage of different modes of transport and parking demand is essential. Data collection is also required to estimate the parking fares also. Parking surveys will help to provide all these information. Since the duration of parking vehicles is different, several statistics can be used to access the parking need.

1.1 Problem Definition

Car parking has been a serious issue due to rapid increase in vehicles and to cater this problem we require parking slots in important market destinations. We have limited land source so the construction of multilevel parking is very important as it accommodates large number of vehicles at one place. Parking is an essential component of transportation. The number of passengers are increasing in Kottayam railway station but the parking of vehicles is a major concern as there is scarcity of land space. To cater the vehicles, multi-level car parking lots are necessary.

1.2 Objectives

The main objectives are to:

1. To provide a specific parking place in the area
2. Easy regulation for parking traffic
3. Ease of travel from railway station to different destinations
4. To provide parking spaces to all passengers which require parking

2. METHODOLOGY

2.1 Study Approach

The count of 2-wheelers and 4-wheelers arriving and departing in Kottayam Railway station were collected for 48 hours. The data were collected on 11/03/2019 and 14/03/2019. In and Out survey was conducted and the total accumulation pattern was obtained. The maximum count of 2-wheelers and 4-wheelers on 2 days were taken. The design was done on the maximum found data. Existing area is studied and the design is done.

The design is done based on IRC SP-12(2015).

2.2 Study Area and Data Collection

Study stretch was identified based on the space constraints of areas. The study area selected was Kottayam Railway station. The area selected for the data collection is the Kottayam railway station. The parking data was collected by conducting parking survey. Parking data includes the number of vehicles entered and the number of vehicles left during the study period. Also the area for the parking space was also measured.

2.3 Data Analysis

Analysis of data collected using parking survey has to be done. Analysis includes study of general characteristics of the parking in the study area. These characteristics include

vehicle composition, parking demand and the parking accumulation.

2.4 Study Area

The study area and procedure for collection of data by manual counting was done and the observations were noted. Study area selected is Kottayam railway station. Kottayam railway station is located in Kottayam, Kerala, India. Kottayam railway station is managed by Southern Railway. Kottayam lies on the busy rail route between Thiruvananthapuram and Ernakulam. It is an NSG 3 category station. The station is served by several long distance trains connecting most major cities in the country on a daily basis like New Delhi, Mumbai, Chennai, Bengaluru, Hyderabad, Coimbatore, Bhopal, Pune and Mangalore.

Kottayam railway station is the nearest railway station and caters to famous tourist destinations like Kumarakom. Kottayam railway station is also used by pilgrims going to Sabarimala temple though Chengannur is the hub of Sabarimala. During Sabarimala pilgrim (Mandala) season, state transport bus regularly operates from this station.

2.5 Data Requirements

The data required are:

- 1) Vehicle composition.
- 2) Parking accumulation.
- 3) Site area.

3. DATA ANALYSIS

The data collected from the study area were analysed and various conclusions were obtained from the dataset. The parking demand on two days were computed manually and the mean value of the each category of vehicles is computed. The vehicle categories observed in the study area were two wheelers and four wheelers.

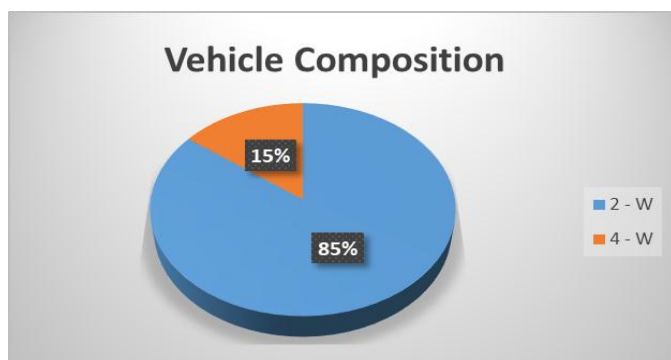


Figure 1- Vehicle Composition

3.1 Peak Parking Period

Peak parking period can be obtained from parking accumulation curve. Parking accumulation is the total number of vehicles parked in an area at a specified moment. The number of vehicles considered is the mean value of total number of vehicles in weekdays.

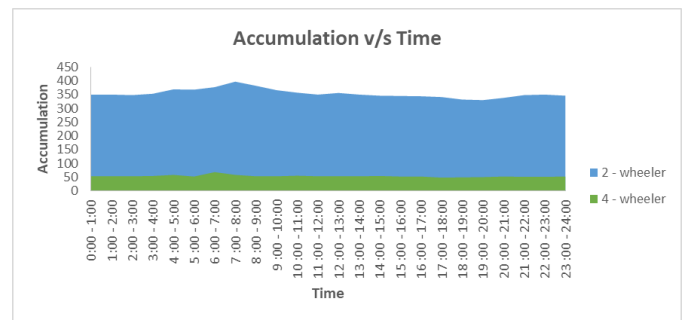


Figure 2- Accumulation of vehicles

3.2 Parking Demand

Peak accumulation of 2-wheelers on 11/03/2019 = 397
 Peak accumulation of 4-wheelers on 11/03/2019 = 68
 Peak accumulation of 2-wheelers on 14/03/2019 = 394
 Peak accumulation of 4-wheelers on 14/03/2019 = 58
 Assuming growth rate = 5%

Design period = 10 years

Maximum value of peak accumulation on both days:

2-wheeler = 397

4-wheeler = 68

Anticipated parking demand:

2-wheeler = $397 \left((1 + (5/100))^{10} \right) = 646.67 \sim 648$

4-wheeler = $68 \left((1 + (5/100))^{10} \right) = 110.71 \sim 111$

Parking Demand (in terms of Equivalent Car Space) = $(648 * 0.25) + (111 * 1) = 273$ ECS

4. RESULTS AND DISCUSSIONS

Peak accumulation of 2-wheelers on 11/03/2019 = 397
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5. CONCLUSIONS

The design of multilevel parking lot has been done by using In- Out survey. The design of parking lots for 2 – wheelers were done for 648 bays and for 4 – wheelers were done for 111 bays. The parking bays layout were done using AutoCAD. The parking lot for 2 – wheelers consist of 3 levels (G+2) and for the 4 – wheelers consist of 2 levels (G+1). The mechanized parking system is designed to use for 4- wheeler parking. The 2 –wheeler parking lot consist of 720 bays and the 4 –wheeler parking lot consist of 120 bays.

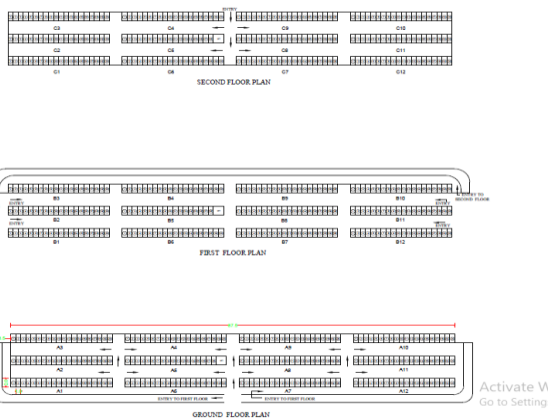


Figure 3 – 2W lot

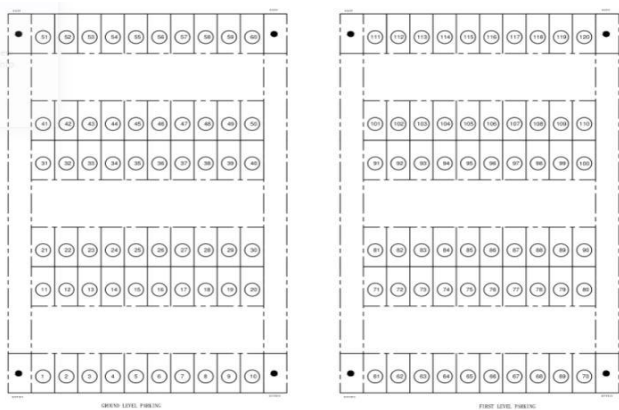


Figure 4 – 4W lot

5.1. Suggestions

Few suggestions to improve the parking facility in Kottayam railway station include the following:

- Provision of separate parking lots for VIP vehicles.
- Remove waste materials present in the premises.

5.2. Future scope

In this study, data collection using In-Out survey is used but license plate method can also be used and is more accurate than In-Out survey. Also this study can be extended to various other office buildings.

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