“Evaluation of Parking Demand: A Case Study of Vadodara Railway Station”

Sakina Lightwala, Kuldip Parmar, Devang Rathod, Jainam Shah, Punit Solanki, Dhrumil Patel

1,2,3,4,5,6Dr. Jivraj Mehta Institute of Technology, Mogar.

Abstract-- Rapidly increasing growth in vehicles density has put HIGH strain and congestion because of high vehicle ownership and poor public transport facilities especially in the cities where population is in millions. Parking space availability is one of the most serious issues in most of the cities. The increase in heavy population in cities has resulted in increase in the travel demand. This study deals with Vadodara Railway Station as it is center of economic development and trading also tourist junction. Development of a city or of a region can only take place if proper atmosphere and infrastructure is made available. This region has been already more congested because of peoples roaming. This study is conducted for investigation and evaluation of problem related to present parking facilities at Vadodara Railway Station. Main objectives of this study the parking demand analysed based on parking survey.

Keywords-- Vehicle Parking Analysis, Vadodara Railway Station, Parking Surveys, Parking Demand.

1. INTRODUCTION

Each medium of transportation involves three necessary elements, without which it cannot operate effectively: the vehicle, the right-of-way, and the terminal. For water transportation, these essentials consist of vessels, waterways, and port facilities; for rail and road transportation, trains, trucks and stations; for air transportation, planes, airways and airports. Similarly, the elements of motor transportation are vehicle, the road, and a place to park at the end of trip. Increased urbanization gives rise to problem of congestion. As city growing, it will be important to plan and build new facilities for both public and private transportation. There is a strong relationship between parking facilities and traffic flow characteristics in the city. Unplanned urbanization and transport facilities cause parking problems. Inadequate parking facilities results in decrease of road capacity and many negative side effects such as air, and noise pollution.

Beside these, it also causes economic consequences by losing time and fuel, loss of productivity, high energy consumption and increase in accidental death rates. Thus, all parking facilities” as well as others should be designed and planned properly in order to provide a better life for the people and for the prosperity of the city. Due to rapid growth in population, increase in mobility of the traffic flow rate has begun. Although railway station have their own parking facilities, people tend to park on the street and go to underground parking only when no space is available on the street.

A. Parking Scenario in India

India have experienced large increase in the total numbers registered vehicles from about 0.3 million on the 31 march, 1951 to about 145 million as on 31 march, 2011. The total registered vehicles in the India grow at Compound Annual Growth Rate of 9.9% between 2001 to 2011 years.

During 2001 to 2011 growth rate of registered motor vehicles was almost three times the growth rate of a road network. Delhi have the largest registered motor vehicles, followed by Bengaluru (37.9 lakhs), Hyderabad (30.3 lakh) and Pune (20.9 lakhs).

These five cities accounted for 49.3% of the total vehicles of the 35 million plus cities. Amongst the top five cities in terms of the total number of registered motor vehicles. The highest Compound Annual Growth Rate of 12.94% was recorded by Pune.

B. Parking Problem Scenario in India

- Limited Parking space
- Lack of Parking Information
- Lack of Driver Navigation System inside the Parking Space
- Long Queue for Entry at Parking Lots

C. Need of Study

In India mostly all cities are suffering for a want of sufficient parking facilities. In Gujarat Vadodara Railway station is known for its high trade and commerce and tourist junction. The increase in population has put a pressure on the existing parking system on the station, which has been unable to compete with the Rapid Growth of City. The increasing demand in parking system has created a big void in transport supply causing people opting for personal modes like vehicle and it requires good parking facility.

Vadodara railway station parking is the centre of the city. Large number of passengers of train park their vehicles at station. Main vehicle parkers are passengers (commuters) and peoples working in bank, restaurants, commercial centres, shopping complex, residential flats, railway station etc, which are located along the road. This results in high parking demand at Vadodara Railway Station. There are lots of peoples whom are commuters by using railway as transport mode. Therefore, provision of adequate and efficient and well-designed parking facility is essential.

D. Aim and objective of Study
The aim of this study is to identify the problems related to parking in existing area by conducting parking survey data and to give alternative solution and to carry out modification for improved and smooth flow of vehicle.

To study the existing parking demand at Vadodara Railway station and to identify the problems related to parking in existing area by conducting parking survey method.

To evaluate adequacy of parking facility and to meet the parking demand and to carry out modification for smooth traffic flow.

II. LITERATURE REVIEW

A. General

Urbanization is increasing globally in all countries including India. India is facing this phenomenon due to migration of population in search of employment, literacy and better life style. The population has already surpassed 1.5 billion and it continues to grow at a heady rate. The new development due to this migration is not enough for integration of infrastructure facilities and there is an increasing space in demand and supply. Due to continuous increase in vehicles, parking problem arises in big cities. There are many options available to transport planner. Options may be multi-storey or basement parking. The multi-storey or basement parking can be provided to minimize time to park and un-park vehicles. The aim of this study is to identify the problems related to parking in existing area by collecting parking survey data and to give alternative solution and to carry out modification for smooth flow of vehicles.

B. Literature Review

1. Er. Kinjal Jain and Prof. Krupa Dave have researched and studied on

“Parking Problem at Vadodara Railway Station”

Vadodara has many historical places to visit. The major portion of trade, commerce and economic activity of the city happens at Vadodara Railway Junction. Parking demand at Railway Junction of city, especially the parking no 7 area is long 340m having haphazard parking and time consuming and there are no off-street parking facilities ever increasing parking demands moreover Platform no 7 is situated at a fair distance from the entrance of the main railway station. So people have to walk for a distance of about 600m-700m for parking after their vehicles to reach middle of Platform no.1. Thus these locations are prime for the traffic and parking spaces. Further the main market of the city and prime shops on these locations or closely linked with it. To withstand the urban activity of Vadodara and Commuters, there should be systematic parking facilities and proper spaces. For the evaluation of parking demand, parking supply and parking space of the related study area data were collected by conducting parking duration and vehicle count survey, inventory of parking spaces and user opinion survey.

2. Sharifah Adibah Alyia SYED ADNAN, Abdul Azeez KADAR HAMSA (2013) have studied “Evaluating the Parking Demand at Park and Ride Facility at Putrajaya Public Transportation Terminal”

Putrajaya is situated at 25km south from Kuala Lumpur and acts as the federal administration centre of Malaysia. The selected park and ride facility is situated at Precinct 7, Putrajaya. The purpose of this study is to monitor the parking demand on week at the park and ride facility at Putrajaya public transportation terminal. The survey was carried out by License Plate method. A two-way parking utilization survey was used, one day on weekend (Sunday) and the other on (Tuesday) in January 2013. This survey was conducted for thirteen hours starting from 7.00 am to 8.00 pm on each selected day and also feedback survey are involved to identify the information regarding the park and users, perception on several characteristics such as socioeconomic, travel and parking related characteristics.

III. STUDY AREA AND METHODOLOGY

The Vadodara Railway station was built in 1861 for the Bombay, Baroda and Central India Railway company by the renowned Gaekwad ruler Maharaja Khanderao, it was a landmark of Trade, commerce and symbol of development for Vadodara. The Railway station was newly Renovated by Indian Railways in the year 1954 by demolishing the original smaller Railway station. The Vadodara Railway station had silver and Golden Jubilee that is completion of 150 years of establishment on the day 9 January 2010.

A. Location

Vadodara is located at 22.3072° N, 73.1812° E. It has an average elevation of 129 m. City has an area of 149 km² square kilometres. As of 2011 Vadodara had a population of almost 2.2 million people the city consist of the Lakshmi Vilas Palace, the Palace of the Maharaja of Vadodara and the royal family; and his loyal Darbars. It also have the world famous Maharaja Sayajirao University of Vadodara, the largest university in Gujarat. An important industrial, cultural, social and educational hub of western India, the city houses several institutions of national and regional importance and its major industries include petrochemicals, engineering, chemicals, pharmaceuticals, plastics, IT and foreign exchange services amongst others.
B. Population

The population of Vadodara city is increasing at an average growth rate of 14.16% in last decades. This growth was result of revolutionary development of industries, pharmaceuticals, the development of Education centres and industries and companies had increased the number of migrated students, labourers, workers the initial provisional data released by census India 2011, shows that density of Vadodara district for 2011 is 552 people per sq. km. In 2001, Vadodara district density was at 482 people per sq. km. Vadodara district administers 7,546 square kilometres of areas, development of the Vadodara city.

<table>
<thead>
<tr>
<th>Name</th>
<th>District</th>
<th>Population Census 2001-03-01</th>
<th>Population Census 2011-03-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vadodara</td>
<td>Vadodara</td>
<td>1,031,346</td>
<td>1,305,227</td>
</tr>
</tbody>
</table>

D. Field Surveys

Parking surveys are “carried out to collect the survey data for analysis. With the help of Data geometric design is decided and also the vehicle density will be calculated for safe efficient systematic and speedy parking. The different Parking surveys carried out on study stretch are given below:

1) Space Inventory Survey
2) Vehicle count Survey

<table>
<thead>
<tr>
<th>Name</th>
<th>District</th>
<th>Total numbers of vehicles Enters per 30 Min. TIME</th>
<th>NUMBERS OF VEHICLES</th>
<th>Total numbers of vehicles Exit per 30 Min TIME</th>
<th>NUMBERS OF VEHICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1

Figure 2

C. Methodology

The study will follow the following steps.
1) The first step is to study and identification of study area location.
2) Various literature research paper, book, thesis report, related to study are referred.
3) Study area profile give existing situation of Vadodara Railway Station parking lots.
4) Conduct different parking survey.
5) Collected data has been analyzed.
6) Conclusion and recommendation for better parking management in study area.

Figure 3: Vehicle count Survey

Figure 4: Parking Area

Table 1: Growth Trend – Vadodara City
## Space Inventory Survey

Space inventory survey is the measurement (geometry) of the Area and in all directions and dimensions of all units present in the particular area in length breath and height.

![Image of parking at VRS](image)

**Figure 5:** The location of various parking at VRS

## CONCLUSION

- Encroachment Nearby Station Area Should Be Removed.
- Parking Should Be Provided Free For First Two Hours And Overall Should Be Economical.
- Angle Parking Should Be The Best Solution.
- Revenue Created From Parking Should Used For Parking Development Only.
- Parking Must Be Under the cctv Camera And Man Power Should Be Provided For Proper Usage Of Place Inside The Parking Which Will Reduce The Wastage Of Time And As Well As Space.

## References

Papers


IRC Codes: